EMERGENCY AMBULANCE SERVICES
AND
INTER-HOSPITAL PATIENT TRANSPORT SYSTEM
IN NOVA SCOTIA

"STRATEGIES FOR THE NINETIES"

Province of
Nova Scotia

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REPORT TO: Health Services and Insurance Commission

FROM: Ambulance Services Advisory Committee

June 1991

Introduction

The Health Services and Insurance Commission assumed responsibility for the Ambulance Subsidy Program on April 1, 1989. The Commission soon recognized a need for a complete review of all aspects related to Ambulance Services Delivery in Nova Scotia. In October 1989, the Commission approved the Terms of Reference for an Ambulance Advisory Committee to undertake a review and make recommendations to the Commission regarding the current status of the Subsidy Program and to make recommendations as to future directions for ambulance service delivery in Nova Scotia.

In June 1990, the first meeting of the Ambulance Services Advisory Committee was held. This Committee reviewed the Terms of Reference, as presented by the Commission, and these were accepted and are appended to this report.

Concurrently, the Nova Scotia Royal Commission on Health Care was preparing its report as to future directions of health care in Nova Scotia. It also recognized a need to undertake a complete review of ambulance services and fully endorsed the efforts of the Commission, together with the Terms of Reference of the Advisory Committee.

One of the underlying assumptions of the Royal Commission and Government is that health care delivery, including components of ambulance services, will have to be evaluated in order that an acceptable level of patient care can be maintained while managed growth strategies in terms of resources and financial constraints are being introduced.

The primary concern of the Ambulance Operators Association (an organization representing ambulance operators in Nova Scotia) evolves around business aspects of individual operators and the delivery of services in a professional manner with concern for patient care and safety.

Established, but not related, is the Nova Scotia Society of Ambulance Personnel which is a voluntary professional association concerned with issues related to ambulance personnel and patient care. This group, although increasing in membership, was not considered a professional organization in that membership was not a prerequisite to persons practising in ambulance services and it was not a self governing organization.

The Ambulance Services Advisory Committee has determined priority areas for policy development. These include:

1) A mission statement to define program goals and objectives.

2) Draft legislation and regulations for consideration by Government. The areas to be addressed include standards for ambulances and ambulance operators, conditions under which ambulance services can be provided and general legislative guidelines based on recommendations made by the Advisory Committee and accepted by the Commission.

3) Management Information Systems and an Automated Claims Processing System.

4) Education and training, including the roles of the Ambulance Operators Association and Government in the provision of training programs and opportunities. The minimum level of training and appropriate methods of training will also be included.

5) Standards and guidelines for ambulance vehicles, equipment, training, response times, communications, etc.

6) Service delivery which will include an evaluation of the effectiveness and efficiency of existing services and to suggest alternative models for the delivery of ambulance services in Nova Scotia.

7) Pre-hospital care is recognized as a major component of patient care and the role of ambulance services in pre-hospital care will be defined. Role definition and co-ordination of pre-hospital and hospital care will be clarified.

Currently, emergency ambulance services and inter-hospital patient transports are provided through several different sources including two hospitals (Victoria General Hospital, Halifax and Roseway Hospital, Shelburne), 52 private ambulance services and 6 volunteer agencies. Emergency services are provided universally, however, different billing arrangements are in place for the Provincial Ambulance Subsidy Program and third party insurers (primarily car insurance). In addition to the 60 separate arrangements, there are several industrial locations that, through legislation, require ambulances to be on the job site. The use of ambulance services in situations involving third party liability, such as private insurance, D.V.A. and W.C.B., are not covered under the Subsidy Program.

Private ambulance services, in addition to emergency transport and inter-hospital patient transfers, provide services on behalf of the Medical Examiner's Office and may operate a body removal service.

A system of subsidies, per call and distance charges are incorporated in an annual tariff agreement between the Province and the Ambulance Operators Association on behalf of its members. Subsidies and tariff arrangements vary depending on the size of operation of each operator but generally are categorized under six

distinct classes. The only exception to this is the service operated by the Victoria General Hospital which is funded through the hospital on a budget arrangement. All others operate on a fee-for-service basis.

Utilization and cost of ambulance and inter-hospital transfers varies considerably within regions, depending primarily on the distance from Halifax, local service availability, and general expectations of the community.

RECOMMENDATIONS

1. **MISSION STATEMENT**:

The purpose of an emergency ambulance system is to reduce morbidity and mortality from sudden illness or trauma. It should respond, provide appropriate care and transport the patient to the appropriate medical facility in the best possible condition. The purpose of a patient transport system is to provide a rational system of inter-institutional and hospital patient transfers.

2. **TYPES OF SERVICE**:

Service delivery can be categorized and prioritized as follows:

a) *Emergency Services (unscheduled) including Urgent Transfers:*
To provide timely and appropriate emergency treatment and transportation of patients to medical care facilities in a cost effective manner.

b) *Non-Urgent (Scheduled) Patient Transfers:*
To provide safe, cost effective, patient transportation system, both local and regional, while ensuring maintenance of patient care and safety.

c) *Services Provided on Behalf of Medical Examiners:*
To provide a body transport service at the request of medical examiners in all areas of the Province. In some cases body removal services may be urgent, however, they would be of a lower priority than emergency services.

d) *Body Removal Service:*
Where funeral homes and body removal services may not be readily or economically available, ambulances at times may be used for body removals, particularly in situations where an ambulance is requested in response to an emergency situation. Ambulance vehicles should not be involved in situations where the ability of the ambulance service to respond to emergencies may be compromised.

3. PROGRAM GOALS

Ambulance service delivery in Nova Scotia should encompass the following broad parameters:

1) The service is medically accountable:

Having the necessary medical supervision and control mechanisms in place to ensure accountability for patient care in both the pre hospital and hospital phases of Emergency Care.

2) The service is accessible Province wide:

Provide emergency ambulance services in a timely fashion, emergency treatment, transportation and access to definitive care, province wide.

3) Ambulance services are comprehensive:

Based on the fifteen components of a comprehensive E.M.S. System, ambulance services will be a major component. (see recommendation #9).

4) An integrated delivery system:

All components of the system are organized and structured towards coordinated and timely response to the Emergency needs.

5) The system is cost effective:

Providing the best care at a cost which is acceptable and justifiable to the people of Nova Scotia.

4. LEGISLATION & REGULATIONS GOVERNING THE AMBULANCE INDUSTRY IN NOVA SCOTIA

The Committee recommends that those recommendations contained in this report which are appropriate for Provincial Legislation and Regulations be developed and enacted at the earliest possible date. It further recommends that the Health Services & Insurance Commission and/or the Department of Health & Fitness be provided, through legislation, with the necessary authority to effectively implement these recommendations and to act as the regulatory body.

Legislation should encompass much of the broad recommendations of this report including the licensure requirements, service delivery and the regulatory bodies to administer the legislation. The regulations should include the minimum standards and guidelines for the provision of ambulance services in Nova Scotia, training requirements, response times, communications, and any other regulatory functions contained within this report.

5. MANAGEMENT INFORMATION SYSTEM

The current system for claims processing and management information systems is a completely manual system. It is recommended that a high priority be given to fully automate the claims processing and management information systems, to provide an adequate system of claims processing and introduce a management information system which is not now present.

5.1 *Claim Forms (Form "A"):*
The current reporting system for ambulance operators requires additional registration, administrative, and clinical data in order that appropriate information can be provided for clinical applications, claims audit and assessment data. It is recommended that a revised claims reporting system be implemented as soon as possible.

5.2 *Automated Claims Processing System:*
Currently, all claims submitted for payment for both emergency and inter-hospital transports are processed manually. It is recommended that this system be automated and integrated with provincial registration data and to be processed electronically through the Department of Health's computer system. As a part of this process, provision should be made for electronic claims submissions by operators to accept disc and tele-transmitted data.

5.3 *Management Information Systems:*
Information required for administrative and planning purposes is not now available in a comprehensive, timely basis. It is recommended that with the additional claims data and an automated claims processing system, a management information system be developed to include detail data analysis for administrative and planning purposes.

6. EDUCATION & TRAINING FOR AMBULANCE PERSONNEL:

6.1 It is recommended that a uniform and accessible training program for ambulance personnel be established by, or in conjunction with, a recognized teaching institute to train students to the Emergency Medical Attendant level (E.M.A.1) and that the program be accredited by the Canadian Medical Association.

6.2 Although the E.M.A.(1) Program is the base level qualification of ambulance personnel, opportunities should be provided for additional education/training that is appropriate for local needs and service delivery.

6.3 The E.M.A.(1) Program should be five months in duration and be characterized by:

a) classroom didactic component - 300 hrs.
b) a clinical internship program of 300 hrs. with a designated high volume ambulance service is required and will be approved by the Health Services and Insurance Commission in conjunction with a teaching facility.
c) in addition to the conventional clinical training requirements, training should be provided for driver training, communications, medical terminology, inter-personnel skills, and patient handling.

6.4 It is recommended that an organized first responder program be developed and characterized by minimum first aid, CPR, instruction on airway management, cervical spine control, haemorrhage control, and patient movement skills. New skills may need to be added as new technology is developed. It should be provided for such groups as fire and police departments, certain ambulance services, volunteer organizations and individuals. The program should be developed in conjunction with a recognized training facility, ambulance operators, and such volunteer groups as the St. John Ambulance, Canadian Red Cross, etc.

6.5 That an E.M.A.(1) refresher program be developed and integrated with a licensure/registration program for ambulance personnel. The refresher program should be organized centrally through the training institute and

be mandatory to continue current licensure. The program should be delivered on a regional basis, be of 30-40 hrs. in duration and include topics and training specifically aimed at new advances in pre-hospital care. It is recommended that attendance at a refresher course be mandatory every two years in order to maintain licensure and registration for ambulance personnel.

6.6 It is recommended that annual licensure/registration of E.M.A.(1)'s be required and characterized by:

a) E.M.A.(1) certification in Nova Scotia or equivalency,

b) completion of E.M.A. refresher courses as required,

c) be administered by a provincial authority.

6.7 It is recommended that the Provincial Training Program have appropriate medical direction.

6.8 It is recommended that after the third complete year of the revised E.M.A.(1) training program being implemented, all new ambulance personnel will require E.M.A.(1) training prior to employment as an ambulance attendant. It is further recommended that for those ambulance personnel employed as of the date of implementation of the revised training program who have not yet achieved the E.M.A.(1) standing, a three year grace period be established after which time full licensure/registration will be dependent upon the completion of the training program.

7. GUIDELINES & MINIMUM STANDARDS:

7.1 *Dress Code/Ambulance Personnel:*

It is recommended that a uniform dress code should be designated to provide a professional appearance with consideration for the safety and comfort of ambulance

personnel. Guidelines for ambulance personnel dress codes are included in Appendix "A".

7.2 *Equipment - Ambulance Vehicles:*

It is recommended that all ambulance vehicles be equipped to provide basic life support, safety and comfort for the patient, and appropriate and safe accommodations for ambulance personnel. (Appendix "B" lists minimum equipment to be available to all ambulance vehicles.)

7.3 *Communications:*

It is recommended that the current system of radio communications, utilizing the Integrated Health Care Network, be maintained.

7.4 *Communications/Dispatch:*

It is recommended that regional dispatch/communications be implemented for areas and services within a defined region where it can be demonstrated that improved communications will provide for better patient access to ambulance services. Each region or management area should explore the benefit of a central dispatch system and an improved co-ordinated mutual aid agreement, particularly in times of low demand. Regional dispatch and co-ordination of intra-regional inter-hospital transports is also strongly recommended.

It is further recommended that inter-hospital transports, involving two or more regions or management areas, should be co-ordinated at the provincial level and, where possible, eliminate inefficient service delivery and avoid the provision of duplicated services. Financial compensation may have to be considered to compensate operators and/or regions where there are major shifts in providers of such services.

7.5 *911 Emergency Number:*

Planning and implementation of a Provincial 911 emergency number is in progress and, consequently, it is recommended that all ambulance services be encouraged to participate in the 911 system.

7.6 *Response Times:*

It is recommended that dispatches to all emergency ambulance requests will be 5 minutes or less from the time the request is made to the vehicle being activated. This dispatch time is considered to be the maximum for all areas of Nova Scotia. Regional and metropolitan areas should develop dispatch times appropriate to their own areas.

7.7 *Ambulance Vehicle Staffing:*

It is recommended that the minimum level of staffing required for emergency and/or inter-hospital transports will be two attendants. Although two E.M.A.'s would be desirable, it is recommended that one of the attendants must have an E.M.A. designation and the driver must be in possession of a first responders certificate and a Class IV drivers licence with appropriate driver training. However, certain ambulance services may apply to the Commission for status to have one E.M.A. and a first responder as driver. It is recommended that individual operators establish maximum working hours pertaining to ambulance attendants/drivers to ensure quality of patient care, driving competency and safety.

7.8 *Vehicle Design & Maintenance:*

It is recommended that all ambulance vehicles be designed to meet the minimum guidelines as outlined in Appendix "C" subject to a cost benefit analysis of features included. It is recommended that, in addition to the mandatory annual inspection required by the Department

of Transportation, that all ambulance vehicles be inspected for mechanical defects, equipment, safety considerations, and general appearance, on an annual basis. Additional inspections may be required as a follow-up to regular inspections.

8. SERVICE DELIVERY:

While it is recognized that the overall system of providing emergency ambulance services and inter-hospital transfers provides a level of accessibility to all areas of the Province and for the most part is provided in a cost effective manner, there are regional variations as to the quality and quantity of services provided. It is felt that with some modification in service delivery, that the level of service can be improved, while at the same time, implementing a managed growth strategy. A rational approach to service delivery is required in order to fulfil the goals and objectives of the Program for the good of all Nova Scotians.

8.1 *Organizational Framework:*

It is recommended that the administration and funding of the Nova Scotia Ambulance Subsidy Program remain with the Health Services & Insurance Commission or its replacement structure under the reorganized Department of Health and Fitness.

The role of the Commission, in relation to ambulance services, should continue as follows:

(a) Advise Government on legislation, regulations and standards;
(b) Develop and implement major policy initiatives;
(c) Funding and claims payments;
(d) Program guidelines for training and education;
(e) Ambulance services role in Provincial Disaster Planning;

(f) Management information systems;

(g) Establishment of a standing Ambulance Services Advisory Committee, reporting to the Commission, which will include a medical advisory role and disputes settlement mechanism.

8.2 Regionalization:

It is recommended that regional and sub-regional advisory groups be established within regions and/or management units to promote the planning of ambulance service delivery, communications, central dispatch, and regional ambulance disaster planning. Regional advisory groups could include the Ambulance Operators Association of Nova Scotia, individual ambulance operators, hospital representatives, ambulance medical and nursing personnel, and representatives of the Commission.

8.3 Ambulance Services Advisory Committee:

It is recommended that the Commission and/or its replacement organization should develop a standing ambulance services advisory committee with appropriate subcommittees to advise the Commission/Department of Health on matters related to ambulance services delivery in Nova Scotia. The specific mandate and structure of this committee should be determined by the Commission. It is recommended that the Advisory Committee be comprised of the following:

a) one Commissioner;

b) one representative from the Medical Society of Nova Scotia;

c) one representative from the Department of Health & Fitness or the Nova Scotia Association of Health Organizations;

d) three representatives from the staff of the Health Services and Insurance Commission;

e) three representatives from the Ambulance Operators Association of Nova Scotia;
f) one representative from the Registered Nurses Association of Nova Scotia;
g) one representative of the Nova Scotia Society of Ambulance Personnel.

A case has been made for both urban and rural representation from several of the groups named above. This would result in an overly large committee but such representation can be accommodated in the sub-committee structure which will support the main committee.

8.4 *Duplicated Service Areas:*
With the input of the Commission, the Ambulance Operators Association and local operators, plans should be put into place as soon as possible to eliminate duplication of service areas. It is recommended that financial assistance be considered depending on the extent of change necessary to eliminate duplicate service areas. A review of existing duplicated service areas should be a priority.

8.5 *Service Areas and Boundaries:*
Several areas within the Province may be considered duplicate areas if boundaries are re-assigned based on cohesive service areas. The Commission, in conjunction with the Ambulance Operators Association, should redefine boundaries and eliminate the subsequent duplicated areas. It is further recommended that priority be given to the review of boundaries and service areas in conjunction with the implementation of 911.

8.6 *Provision of Services:*

(a) It is recommended that all ambulance services (subsidy and non subsidy services) including emergency services and inter-hospital transport must be licensed. Licensed operators must maintain current registration and meet the minimum standards for the delivery of service based on the following general parameters:

(i) All new operators must be licensed to operate within Nova Scotia.

(ii) All existing operators (currently providing services under the subsidy program) must be accredited every three years. Accreditation will be based on standards established by the Province and accreditation must be current in order to maintain operator licenses.

(b) The Health Services and Insurance Commission will be the agency responsible for licensing ambulances. Licenses can be revoked at any time by the Health Services and Insurance Commission with just cause.

(c) All appeals will be made to the Minister and the Minister's decision will be final.

(d) Individual ambulance operators will be licensed for all or any of the following ambulance services as mutually agreed by the Health Services and Insurance Commission and the operator:

1. scheduled and unscheduled calls;
2. request of the medical examiner/Fatality Inquiries Act;
3. body removal service.

The Committee recognizes that scheduled and unscheduled ambulance services may be separated but the cost implications of such a division may result in a system that is not cost effective.

8.7 *Monitoring/Quality Assurance:*

It is recommended that the Health Services and Insurance Commission, through the Ambulance Services Advisory Committee, in conjunction with the Ambulance Operators Association, will put into place a mechanism whereby standards and quality assurance programs can be effectively implemented and monitored. The program should include statistical reviews, on-site inspections, and a formal review mechanism to receive and act upon complaints received from health care providers and the general public.

8.8 *Communications Dispatch:*

It is recommended that regional dispatch/communications be implemented for areas and services within a defined region where it can be demonstrated that improved communications will provide for better patient access to ambulance services. Each region or management area should explore the benefits of a central dispatch system and an improved coordinated mutual aid arrangement, particularly in times of low demand. Regional dispatch and coordination of intra-regional inter-hospital transports is also strongly recommended.

It is further recommended that inter-hospital transports, involving two or more regions or management areas, should be coordinated at the provincial level and, where possible, eliminate inefficient service delivery and to avoid the provision of duplicated services. Financial compensation will have to be considered to compensate operators and/or regions where there are major shifts in providers of such services.

8.9 *Future Funding Systems:*

It is recommended that future payment for subsidized services and user fees continue to be negotiated by the Health Services and Insurance Commission and the Ambulance Operators Association. That third party uninsured services such as WCB, DVA, and fees for private insurance, continue to be negotiated between the Ambulance Operators Association and these interested parties.

It is further recommended that the Health Services and Insurance Commission and the Ambulance Operators Association investigate other types of funding systems.

It is recommended that future funding systems and legislation ensure that unscheduled emergency response capabilities are maintained and not eroded by the potential conflict provided by the more lucrative and predictable scheduled transports.

9. EMERGENCY MEDICAL SERVICES SYSTEM INTERFACE:

It is recognized that ambulance services, scheduled or unscheduled, are but only a part of emergency medical services. Although the ambulance service is a major component of the Emergency Medical Services System, the successful delivery of pre-hospital care is contingent upon multiple components of the Health Care System.

It is therefore recommended that the Department of Health & Fitness and regional planning initiatives broaden the concept of ambulance services to adopt the concept of Emergency Medical Services System. Proposals submitted and endorsed by the Medical Society and the Registered Nurses Association of Nova Scotia have developed a blueprint for a broad Emergency Medical Services System to include:

(1) manpower requirements, including first responders, ambulance, medical nursing and hospital personnel;
(2) training programs for ongoing, continuing medical and pre-hospital care training;
(3) appropriate emergency care facilities strategically located throughout the Province;
(4) access to critical care units;
(5) efficient inter-hospital transfer systems;
(6) standardized emergency and inter-hospital transports systems;
(7) integrated communications systems;
(8) accessibility to pre-hospital care;
(9) public information and education as to appropriate access to this system;
(10) consumer participation in planning and program development;
(11) standardize medical records;
(12) communication links with public safety agencies, including police, fire, and EMO;
(13) linkage of ambulance services with overall disaster planning;
(14) mutual aid agreements between neighbouring communities;
(15) evaluation and review by health care planners and providers.

Although it was not within the scope of the Advisory Committee to address all of these areas, it was felt that if the foregoing recommendation is accepted, the ground work for broader planning related to emergency medical/ambulance services will be enhanced.

Acceptance of these recommendations would entail changing the name of the Ambulance Services Advisory Committee, section 8.3, to the Emergency Medical & Ambulance Service Committee.

AMBULANCE SERVICES ADVISORY COMMITTEE

Committee Status: Standing

Terms of Reference:

The purpose of the Ambulance Services Advisory Committee is to assist and advise the Commission in the development of programs and procedures and administration of Ambulance Services and the Ambulance Subsidy Program, through professional input into program planning and liaison with the Ambulance Operators Association of Nova Scotia, the Department of Health and Fitness and other professional bodies. This Committee reports to the Commission through the Program Review and Evaluation Committee.

The Ambulance Services Advisory Committee will assist and advise the Commission on professional and technical matters concerning changes in coverage or delivery of the program. The Committee may deal with issues such as:

1) policy formulation, including level and extent of insured services;

2) program delivery design;

3) legislation and standards of service;

4) education and communications;

5) statistical research;

6) claims processing and payments system (including Management Information System).

The Ambulance Services Advisory Committee shall not deal in matters of tariff and tariff negotiations.

With the approval of the Program Review and Evaluation Committee, the Ambulance Services Advisory Committee may form subcommittees or working groups to undertake reviews or research into specific areas of concern.

Membership:

The membership of the Ambulance Services Advisory Committee is appointed by the Health Services and Insurance Commission and shall consist of:

a) one Commissioner;

b) one representative from the Medical Society of Nova Scotia;

c) one representative from the Department of Health & Fitness;

d) three representatives from the staff of the Health Services and Insurance Commission;

e) one representative from the Nova Scotia Association of Hospital Organizations;

f) two representatives from the Ambulance Operators Association of Nova Scotia;

g) other representation as appropriate.

The Chairman shall be appointed by the Health Services and Insurance Commission and shall be a Commissioner.

Administration:

The Committee will accept agenda items from the Commission, Commission staff, the Program Review and Evaluation Committee, the Department of Health and Fitness, the Medical Society, and the Ambulance Operators Association of Nova Scotia or committee members.

The Committee shall meet at least semiannually or more frequently, as agenda items dictate. The Committee will file an annual report with the Program Review and Evaluation Committee by April 30th of each year. The report should include a summary of the activities of the Committee meetings held during the year.

Expenses for the Committee will be paid by the Commission in accordance with Commission policy.

Minutes shall be taken by the secretary at each meeting and copies forwarded to committee members, the Executive Director of the Commission and to the Chairman of the Program Review and Evaluation Committee.

Commission Approval
188th - October, 1989

DRESS CODE/AMBULANCE PERSONNEL:

The need for a standard dress code for ambulance driver/attendants was addressed by the sub-committee and is included as Appendix "A".

GUIDELINES FOR UNIFORMS TO BE WORN BY AMBULANCE PERSONNEL IN THE PROVINCE OF NOVA SCOTIA

Prepared by:

Standards and Guidelines Sub-Committee,
Ambulance Services Advisory Committee,
Health Services and Insurance Commission,
Province of Nova Scotia
Mr. H.A. Pedersen, Chairman

Guidelines for Uniforms to be Worn By Ambulance Personnel in the Province of Nova Scotia

Preamble:

An uniform should be designed to provide a professional appearance with consideration for the safety and comfort of the wearer. It *is imperative that all ambulance personnel in the Province* wear the same general style and colour of uniform so as to be easily identified by members of the public and to distinguish ambulance personnel from members of other emergency services.

Requirements:

Shoes/Boots

1. Are to be black in colour.
2. Are to be C.S.A. approved safety footwear.

Pants

1. Are to be navy blue in colour.
2. Are to be made from the most fire retardant material available for the manufacture of the particular item.
3. Are to have minimum 1 1/2 inch belt loops.
4. Are to have 1/4 inch retro-reflective striping sewn vertically along the outside seam of each leg. Striping may be of a similar colour to the pant material so long as the striping reflects light for night time visibility.

Shirts

1. Are to be white in colour.
2. Are to be uniform style with epaulettes and two (2) front pockets.

Ties

1. Are to be navy blue in colour.
2. Are to be clip on style only
3. Ties, if worn, are to be attached to the shirt in such a way as to ensure that the tie does not hang down when bending over.

Belts

1. Are to be black in colour.
2. Are to have smooth or protected buckles.

Socks

1. Are to be navy blue or black in colour.

Guidelines for Uniforms to be Worn By
Ambulance Personnel in the Province of Nova Scotia

Flight Suits

1. Are to be navy blue in colour.
2. Are to be uniform style with epaulettes.
3. Are to be made from the most fire retardant material available for the manufacture of the particular item.
4. Are to have a 1/4 inch reflective stripe sewn vertically along the outside seam of each pant leg, a 1/4 inch reflective stripe sewn horizontally around the circumference of each arm and a 1/2 inch reflective stripe sewn horizontally across the mid back.

Sweaters

1. Are to be navy blue in colour.
2. Are to be made from the most fire retardant material available for the manufacture of the particular item.
3. Are to have the word "AMBULANCE" or service name including the word "AMBULANCE" embroidered on the left chest.
4. Are to be uniform in style, "V" neck or crew neck.

Coats/Jackets

1. Are to be navy blue in colour.
2. Are to be uniform in style.
3. Are to be made from the most fire retardant material available for the manufacture of the particular item.
4. Are to have a 1/2 inch reflective stripe sewn horizontally around the circumference of the mid torso or waist band and a 1/4 inch reflective stripe sewn horizontally around the circumference of the upper or lower portion of each arm.

Identification Patches

1. Service name patches, including the word "AMBULANCE", are to be sewn to both shoulders of shirts, flight suits, coats and jackets.
2. Emergency Medical Attendant qualification patches, if worn, are to be sewn to the left chest of shirts, flight suits, coats and jackets.
3. Emergency Medical Attendant qualification patches are not to be worn by anyone other than licensed Emergency Medical Attendants.

Name Tags

1. If worn, are to be firmly attached to the right chest of shirts, flight suits, coats and jackets.
2. Are to be no larger than 1 inch by 3 inches.

Guidelines for Uniforms to be Worn By Ambulance Personnel in the Province of Nova Scotia

Hats

1. Hats, if worn, are to be uniform style and suitable to weather conditions.

General

1. Uniforms are to be worn by all ambulance personnel when engaged in ambulance duties.
2. Uniforms or portions of the uniform are not be worn in any social settings. This includes, but is not limited to, when "on call" and subject to being called in for ambulance duties.
3. The use of flight suit style uniforms is recommended, particularly in situations where it is necessary to get dressed to respond to an ambulance call, ie: nights, volunteer services, "on call" personnel.
4. All uniform items are to be maintained in reasonable working condition. All damaged or worn items are to be replaced as soon as possible.

February 21, 1991

MINIMUM EQUIPMENT/AMBULANCE VEHICLES:

The sub-committee prepared a list of minimum equipment necessary for each ambulance vehicle.

This list includes (A) Safety/Light Rescue Equipment; (B) Patient Care/Transportation Equipment.

The most significant addition would be the "M" type oxygen cylinder in each vehicle which will increase the oxygen capacity of each ambulance to approximately 4,000 litres.

MINIMUM EQUIPMENT TO BE AVAILABLE TO ALL AMBULANCE VEHICLES IN THE PROVINCE OF NOVA SCOTIA

Prepared by:

Standards and Guidelines Sub-Committee,
Ambulance Services Advisory Committee,
Health Services and Insurance Commission,
Province of Nova Scotia
Mr. H.A. Pedersen, Chairman

Minimum Equipment to be Available to all Ambulance Vehicles in the Province of Nova Scotia

A) Safety/Light Rescue Equipment

Item		Min. Quantity	Specifications
1.	Hard Hats	2	C.S.A. approved, white in colour, with chin straps and reflective blue markings.
2.	Leather Work Gloves	2 pair	Standard protective all leather.
3.	Safety Goggles	2 pair	C.S.A. approved, clear colour.
4.	Flares	4	Spiked or with stands. Non-flammable equivalent acceptable.
5.	Portable Hand Lights	2	Lantern type. Able to be free-standing.
6.	Fire Extinguisher	1	10 lb. U.L.C. rated dry chemical. Two (2) 5 lb. U.L.C. rated dry chemical acceptable.
7.	Bolt Cutters	1	Hardened steel jaws.
8.	Wrecking Bars	2	1 36 in. pry bar. 1 27 in. crow bar
9.	Window Punch	1	Spring loaded.
10.	Multihead Hammer	1	Kelly tool style.
11.	Rescue Rope	1	100 ft. length. Two (2) 50 ft. lengths acceptable. Nylon or better.
12.	Hacksaw	1	With six (6) spare hardened blades and one (1) can lubricant.
13.	Straight Edge Screwdriver	1	
14.	Disaster Pouches	2	Opaque. Heavy Gauge vinyl.
15.	Tow Chain	1	Minimum 10 ft. with drag link at each end, etc.
16.	Booster Cables	1 set	Heavy Duty.

Minimum Equipment to be Available to all Ambulance Vehicles in the Province of Nova Scotia

B) Patient Care/Transportation Equipment

Item		Min. Quantity	Specifications
1.	Wall Oxygen Outlet	1	Pressure compensated flowmeter. 0-15 l.p.m. adjustable. Screw thread wall connection.
2.	"E" Tank regulator	1	Pressure compensated flowmeter. 0-15 l.p.m. adjustable with 0-2000 litre content gauge and pin indexed yoke. Cylinder wrench to be attached to yoke.
3.	"D" Tank regulator	1	Bordon flow gauge. 0-15 L.P.M. with 0-2000 litre content gauge and pin indexed yoke.
4.	Oxygen Cylinder "M"	1	To be safely stowed under bench seat in a permanently mounted cradle.
5.	Oxygen Cylinder "E"	1	To be safely stowed in vehicle in a permanently mounted cradle in such a way that it can be used for patient care in vehicle without removing it from the cradle.
6.	Oxygen Cylinder "D"	2	1 to be in portable airway kit. 1 to be stowed with oxygen cylinder "E".
7.	Suction Installed	1	Electrically operated portable style. To be mounted near head of primary patient area and connected to vehicle charging system.
8.	Suction Portable	1	Electrically operated. To be carried in Airway Kit.
9.	Primary Cot	1	Ferno model 30 or equivalent with three (3) safety restraint straps.

Minimum Equipment to be Available to all
Ambulance Vehicles in the Province of Nova Scotia

B) Patient Care/Transportation Equipment cont'd

10.	Secondary Cot	1	Ferno model 107 combination stairchair/stretcher or equivalent with two (2) safety restraint straps.
11.	Carry-all Stretcher	1	Vinyl coated canvas with vertical plywood slats.
12.	Long Spine Board	2	6 ft. X 18 in. X 3/4 in. High grade plywood coated so as not to cause splinters. Must have sufficient hand/strap holes.
13.	Short Immobilization Device	1	Ferno K.E.D. or equivalent.
14.	Cervical Collars	8	Two (2) each size: Ped., Sm., Ad., Med. Ad., Lg. Ad. Rigid extrication style, ie: vertebrace, stifneck.
15.	Head Brace	1	Lightweight, vinyl coated foam type or equivalent.
16.	Immobilization Straps	6	2 - 9 ft., 4 - 6 ft., with alligator type buckle.
17.	Traction Splints	2	1 Paediatric size 1 Adult size With padded ankle hitch, ie: Hare, Sager, Trac-3.
18.	Padded Splints	4	2 - 3 ft. 2 - 15 in. Styles other than padded boards are acceptable, ie: vacuum.
19.	Sterile Childbirth Kit	1	Commercially available or equivalent.
20.	Sterile Burn Kit	1	To contain: 1 large, 2 medium and 4 small individually wrapped sterile sheets.
21.	Isolation Kits	2	Individually wrapped. To contain: 1 full sleeve gown, 1 pr. isolation goggles, 1 cone type face mask, 1 head cover, 1 pr. each small, medium and large vinyl gloves.

Minimum Equipment to be Available to all Ambulance Vehicles in the Province of Nova Scotia

B) Patient Care/Transportation Equipment cont'd

22.	Airway Kit	1	To contain airway management equipment as specified in Nos. 29 & 30.
23.	Trauma Kit	1	To contain patient care items as specified.
24.	B.P. Cuff Installed	1	Circular, non-mercury gauge. With adult size removable cuff.
25.	Triage Tags	24	To follow international design standards.
26.	Stethoscope	1	To be carried in airway kit. To be of good quality.
27.	B.P. Cuffs Portable	2	1 Paediatric size. 1 Adult size. With interchangeable dial gauge. To be carried in airway kit.
28.	Penlight	1	To be carried in airway kit. Non-disposable type.
29.	Oral Pharyngeal Airways	8	One each size in airway kit. One each size in vehicle. 2 X 40 mm., 2 X 60 mm., 2 X 90 mm., 2 X 100 mm. Size equivalent acceptable. Individually wrapped.
30.	Nasal Pharyngeal Airways	3	One each size in airway kit. 1 X 6.0 cm., 1 X 7.0 cm., 1 X 8.0 cm. Individually wrapped. Soft rubber.
31.	Oxygen Patient Tubing	4	1 in airway kit. 3 in vehicle. This does not include tubing attached to masks.
32.	Oxygen Mask Non-Rebreather	5	1 in airway kit. 4 in vehicle. Clear under the chin type.
33.	Oxygen Mask Paediatric	4	1 in airway kit. 3 in vehicle. Clear under the chin type.

Minimum Equipment to be Available in all Ambulance Vehicles in the Province of Nova Scotia

B) Patient Care/Transportation Equipment cont'd

34.	Oxygen Mask Venturi	5	1 in airway kit. 4 in vehicle. Clear under the chin type.
35.	Oxygen nasal Prongs	3	1 in airway kit. 2 in vehicle.
36.	Ventilation Bag	1	To be carried in airway kit. Easily cleanable and with oxygen reservoir.
37.	Ventilation Masks	3	One each size in airway kit. Small, medium and large. Clear with permanently inflated cuff.
38.	Suction Patient Tubing	4	1 on portable suction. 1 on installed suction. 2 in vehicle. Disposable.
39.	Suction Tonsil Tips	4	1 on portable suction. 1 on installed suction. 2 in vehicle. With thumb vacuum control. Disposable.
40.	Suction Catheters	6	One each size in airway kit. 2 each size in vehicle. 3 X 10 Fr., 3 X 14 Fr. Individually wrapped. Disposable.
41.	"Dee-Lee" suction	3	1 in airway kit. 2 in vehicle.
42.	Sterile Lubricant	4 packets	To be carried in airway kit.
43.	Disposable Gloves	6 pr.	1 pr. each size in airway kit. 1 pr. each size in vehicle. 2 X sm., 2 X med., 2 X lg.
44.	Glucose Paste	2 packets	To be carried in trauma kit.
45.	Alcohol Wipes	20	10 in trauma kit. 10 in vehicle.
46.	Tongue Depressors	12	6 in trauma kit. 6 in vehicle.
47.	Safety Pins	24	12 in trauma kit. 12 in vehicle.

Minimum Equipment to be Available in all Ambulance Vehicles in the Province of Nova Scotia

B) Patient Care/Transportation Equipment cont'd

48.	Bandage Scissors	1 pr.	To be carried in trauma kit. Heavy duty.
49.	Sterile 4X4 Pads	24	12 in trauma kit. 12 in vehicle.
50.	Sterile 6X8 Pads	18	10 in trauma kit. 8 in vehicle.
51.	Non-Sterile 4X4 Pads	1 bag	Divided evenly between trauma kit and vehicle.
52.	Sterile Eye Pads	6	4 in trauma kit. 2 in vehicle.
53.	Gauze Roll Bandage	18	10 in trauma kit. 8 in vehicle. "Kling" or equivalent.
54.	Triangular Bandages	18	9 in trauma kit. 9 in vehicle. 36 in. X 36 in. X 48 in.
55.	Cold Packs	3	1 in trauma kit. 2 in vehicle. Chemical type.
56.	Tape 1.5 inch	6 rolls	1 each type in trauma kit. 2 each type in vehicle. Cloth tape and "Transpore" tape.
57.	Tape 3 inch	4 rolls	1 in trauma kit. 3 in vehicle. Cloth.
58.	"Gun Tape"	2 rolls	1 in trauma kit. 1 in vehicle. Suitable for head immobilization.
59.	Bandage Strips	24	12 in trauma kit. 12 in vehicle. Sterile individually wrapped.
60.	Linen Sheets	6	Including 2 on primary cot.
61.	Linen Pillow Cases	6	Including 3 on pillows.
62.	Pillows	3	Including 1 on primary cot. Plastic covered, hypo-allergenic.
63.	Blankets	4	Including 1 on primary cot. Hypo-allergenic, non wool.

Minimum Equipment to be Available to all Ambulance Vehicles in the Province of Nova Scotia

B) Patient Care/Transportation Equipment

64.	Facial Tissues	4 boxes	
65.	Toilet Tissue	1 roll	
66.	Emesis Basins	4	Bucket type with covers for disposal.
67.	Male Urinal	1	Plastic
68.	Bedpan	1	Plastic. Low profile, fracture type.
69.	Sterile Fluid	2000 ml.	500 ml. in trauma kit. 1500 ml. in vehicle.
70.	Sharps Receptacle	1	Puncture proof. Must be marked "Bio-hazard Material". Must be sealable when full.
71.	Garbage Receptacle	1	With 6 spare plastic bags including 1 in use.

VEHICLE DESIGN STANDARDS:

The recommendations of the sub-committee are attached as Appendix "C".

The sub-committee utilized as a bench-mark a proposed national standard for ambulance vehicles submitted by the Standards Council of Canada. The aim of the sub-committee in its deliberations was to provide adequate safety precautions, patient and attendant comfort, adequate space for storing the equipment and provide the attendant with adequate space to properly care for the patient while transporting.

It was suggested by the sub-committee that the stretch van-type ambulance vehicle is the size to be utilized in Nova Scotia as opposed to the ordinary van-type ambulance as it appeared there has been an increase in the use of this size of vehicle.

The modular type ambulance vehicle has also been included in the setting of vehicle standards; the sub-committee was of the opinion this type of vehicle may be utilized more in the future. There are now two such vehicles in the subsidy program.

Vehicle inspection was discussed; the sub-committee came to the conclusion that an outside, independent agency should be responsible for the inspection of vehicles as to their road worthiness, mechanical status, etc. It is recommended by the sub-committee mechanical inspections of ambulance vehicles should take place at least twice a year and be performed by the agency inspecting school buses and other vehicles involved in public transport.

The sub-committee is at this moment in time making enquiries as to the feasibility of this option; the agency doing these inspections is the Public Utilities Board.

The inspection of ambulance vehicles pertaining to appearance and minimum equipment standards should be performed by inspectors employed by the Department of Health whose responsibilities would also include monitoring ambulance services throughout the Province, checking on quality assurance, manpower, training, etc.

It should be noted the sub-committee's recommendations on ambulance vehicle standards need to be addressed by a professional group to ascertain technically if the recommendations can be implemented economically and not pose any undue problems to the manufacturers and conversion companies.

It was the recommendation of the sub-committee that the Ambulance Operators Association of Nova Scotia should review the Vehicle Design Standards and report back to the sub-committee giving their estimate as to cost and what items they may consider to be optional.

AMBULANCES - GENERAL CHARACTERISTICS

AND

MINIMUM DESIGN STANDARDS

FOREWORD

This document was approved by the Standards/Guidelines sub-committee, made up of the following:

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FOREWORD

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AMBULANCES - GENERAL CHARACTERISTICS

1. OBJECTIVE AND APPLICATION

This standard specifies the minimum requirements pertaining to the characteristics of a vehicle which is equipped with a section fitted out to accommodate a patient on a stretcher and used to transport this patient, taking into account his comfort and safety.

2. REFERENCES

The documents listed below and referred to in the text complement this standard.

2.1 NQ 1013-110/1990 Ambulances - General Characteristics.

1990 Ontario Ministry of Health - Supply Specifications - Ambulance Conversions.

2.2 Canadian Government Specifications Bureau (CGSB), Supply and Services Canada, Ottawa, Ontario, K1A 1G6

CAN/CGSB-3.14-M88	Liquefied Petroleum Gas (Propane)
CGSB 1-GP-192Ma-1985	Bridge coatings, non-skid, containing epoxy resins

2.3 Canadian Standards Association (CSA), 178 Rexdale Blvd., Rexdale, Ontario, M9W 1R3

CSA C 22.10-1987	Canadian Electrical Code - Safety Standard for Electrical Installations.

2.4 Canadian Gas Association (CGA), 55 Scarsdale Road, Don Mills, Ontario, M3B 2R3

CAN/CGA B149.1-M86	Natural Gas Installation Code
CAN/CGA B149.2-M86	Propane Installation Code

2.5 Compressed Gas Association (CGA), 500 Fifth Avenue, New York, New York, 10036, U.S.A.

CGA V-5	Diameter - Index Safety System - Non-Interchangeable Low Pressure Connections for Medical Gas Application

2.6 Society for Automotive Engineers Inc. (SAE), 400 Commonwealth Drive, Warrendale, Pennsylvania 15096, U.S.A.

SAE J 537 JUN 86	Storage Batteries
SAE J 553c	Circuit Breakers
SAE J 563 JUN 88	Cigar Lighter Receptacles
SAE J 575 JUL 83	Test for Motor Vehicle Lighting Devices and Components
SAE J 576 NOV 81	Plastic Materials for Use in Optical Parts of Motor Vehicle Lighting Devices
SAE J 578d	Colour Specification for Electric Signal Lighting Devices
SAE J 986 FEB 87	Sound Level for Passenger Cars and Light Trucks
SAE J 994 MAR 85	Alarm, Backup, Electric Performance, Test, and Application
SAE J 1100 JUN 84	Motor Vehicle Dimensions
SAE J 1127 JUN 80	Battery Cable
SAE J 1292 OCT 81	Automobile, Truck, Trailer and Motor Coach Wiring

2.7 American National Standards Institute (ANSI), 1430 Broadway, New York, New York, 10018, U.S.A.

ANSI C 73-1980	On Dimensions of Attachment Plug and Receptacles
ANSI Z 26.1-1983	Safety Code for Safety Glazing Materials for Glazing Motor Vehicles Operating on Land Highways

2.8 American Society for Testing and Materials (ASTM), 1916 Race Street, Philadelphia, Pennsylvania 19103, U.S.A.

ASTM B 88	Specification for Seamless Copper Water Tube

ASTM D 2244-1985	Calculation of Colour Differences from Instrumentally Measured Colour Coordinates

2.9 Federal Specifications and Standards (FED.SPEC), General Services Administration, Specification Section, Room 6039, 7th and D Sts. S.W., Washington, D.C. 20407, U.S.A.

KKK-A-1822c	Star-of-Life Ambulance

2.10 Canada Motor Vehicle Safety Standard, Transport Canada, Ottawa, Ontario, K1A 0N5

MVSA 1970	Motor Vehicle Safety Act and the related amendments published in the Canada Gazette, Part II

2.11 The Tire and Rim Association Inc., 1988, 3200 West Market Street, Akron, Ohio 44313, U.S.A.

2.12 Ambulance Manufacturer Division (AMD), Truck Body and Equipment Association (TBEA), 4907 Cordell Avenue, Bethesda, MD 20814, U.S.A.

AMD 001	Static Load Test for Ambulance Body Structure
AMD 002	Body Door Retention Components Test
AMD 003	Oxygen Tank Retention System Test
AMD 004	Litter Retention System Test
AMD 005	Ambulance Electrical System Test
AMD 006	Sound Level Test Code for Ambulance Patient Compartment Interiors
AMD 007	Carbon Monoxide Levels for Ambulance Patient Compartment Interiors

3. VOCABULARY

The terms used herein are commonly used in the automotive field. However, the following expressions have been defined in order to facilitate comprehension of the text.

3.1 Definition of Terms

accessible at all times: refers to a location that can be easily reached without tools and without having to move equipment such as a stretcher, the head of which is either in the horizontal position or raised, while the vehicle is either stopped or moving.

ambulance: motor vehicle consisting of a cabin for driving the vehicle and a section fitted out to accommodate one or more patients on a stretcher, allowing urgent medical care to be provided to this or these patients while being transported.

van ambulance: an ambulance built by modifying a light van.

Note: - This is the type II ambulance.

modular type ambulance: ambulance built by modifying a cutaway van or a cabin chassis to which an ambulance compartment is juxtaposed.

Note: - This is the type I or type III ambulance.

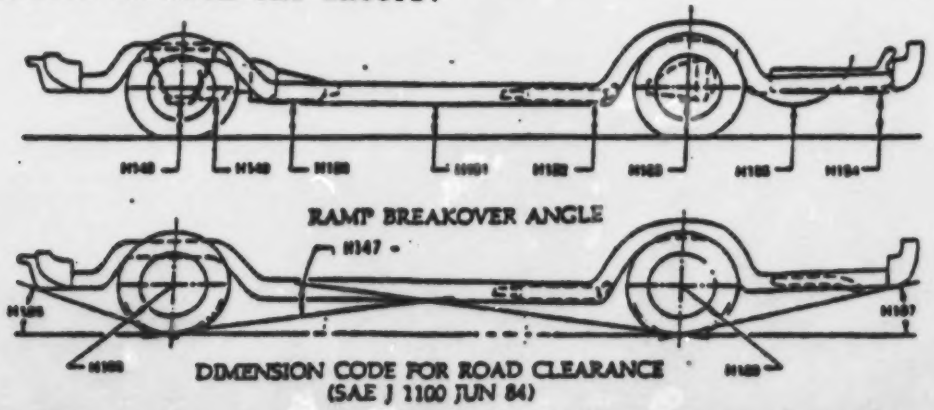
angle of approach: maximum angle between the support plane of the vehicle and the planes tangent to the front tires when the vehicle is in service, such that no rigid part of the vehicle in front of the first axle is located beneath these planes.

Note: - It is rated H106 in the international vehicle dimension code (see SAE J 1100 JUN 84).

angle of departure: maximum angle between the support plane of the vehicle and the planes tangent to the rear tires when the vehicle is in service, such that no rigid part of the vehicle is located beneath these planes.

Note: - It is rated H107 in the international vehicle dimension code (see SAE J 1100 JUN 84).

ramp breakover angle: minimum acute angle between two perpendicular planes along the longitudinal median plane of the vehicle (Original plane Y, see BNQ 1000-800, section 5.1) that are both tangent to the static load point of the front and rear tires when the vehicle is in service, taking into account that the intersection of these tangent planes touches the lower part of the vehicle between the wheels.



DIMENSION CODE FOR ROAD CLEARANCE
(SAE J 1100 JUN 84)

Note: 1. This angle specifies the largest ramp on which the vehicle can pass.

2. It is rated H147 in the international vehicle dimension code (see SAE J 1100 JUN 84).

cold cranking amps (CCA): value in amperes of the intensity of the current produced by a battery for 30 consecutive seconds, at a temperature of -17.8° C + 0.6° C.

Note: - The voltage measured at the terminals of the battery after the 30 seconds must equal at least 80% of the initial voltage.

shoulder belt: a seat belt assembly made of fabric or any other flexible synthetic material intended to restrain movement of the chest and shoulder regions when the vehicle is involved in a collision.

radiator streamlining: part that surrounds the fan and forces air to pass through the radiator grille in order to increase efficiency.

seat belt: a combined shoulder belt and lap belt worn together.

lap belt: a seat belt assembly made of fabric or any other flexible synthetic material intended to restrain movement of the pelvis when the vehicle is involved in a collision.

nominal continuous electric charge: sum of the electric charges computed from the engine ignition system, the halogen high beam headlights, all the parking lights and all the other lights that turn on with them, the windshield wipers operating at maximum speed, the heating or air conditioning system (choose the one which uses the least power) of the cabin and ambulance compartment operating at maximum intensity, the ambulance's seat belt warning system operating in primary mode, the lighting of the ambulance compartment at high intensity, the receiver-transmitter radio in reception mode as well as a 20 ampere load for medical accessories.

main stretcher: stretcher placed on the driver's side.

driver: the occupant of the vehicle seated behind the steering control system and responsible for manoeuvring the vehicle.

second rear axle: axle at the greatest distance from the front axle when the vehicle is equipped with rear wheels in tandem.

Note: - See rear axle.

limited slip differential: type of differential designed to distribute the engine torque unequally between the two wheels when one of the wheels is spinning.

anti-lock braking system: a portion of the vehicle's service brake system that automatically prevents the brakes from locking by applying the brakes in sequence.

in working condition: see vehicle in working condition.

in service: see vehicle in service.

operator: any person recognized by the Province and the Ambulance Operators Association of Nova Scotia to operate an ambulance service.

manufacturer: by convention, a firm engaged in the manufacture of motor vehicles.

van: utility vehicle assembled from a sectional van body, the interior of which is used to drive the vehicle and transport people and goods consists of a single integral section.

cutaway van: utility vehicle with an open cabin in the back containing an adjoining platform able to accommodate the body of an assembled section. (this represents chassis to accept modular compartment)

ground clearance: distance between the support plane of the vehicle and the lowest point of the central part on the underside of the vehicle, that is the section of the vehicle that is located between the front and rear bumpers and which lies in the median zone covering 80% of the minimum distance between the inner surfaces of the wheels of one axle of the vehicle.

Note: - It is rated H157 in the vehicle dimension code (See SAE J 1100 JUN 84).

liquefied petroleum gas LPG: hydrocarbons in compliance with Standard CAN/CGSB-3.14-M88.

compressed natural gas (CNG): natural gas consisting primarily of methane and compressed under pressures of up to 20,600 kPa.

fireproof: characteristic of a product or material that complies with the CMVSS flammability regulation (section 302).

ambulance compartment: an integral section of the ambulance designed to allow pre-hospital care to be provided and patients on stretchers to be transported.

Note: 1. In context, it is correct to use compartment alone to designate the ambulance compartment.

2. the expression ambulance cell is not used herein; it designates a detachable unitized section, assembled and installed on the vehicle, which does not require the vehicle to be present in order to be used.

assembler: by convention, a firm engaged in altering vehicles that bear the CMVSS mark.

occupant: any person in a vehicle.

designated seating position: designated position for any seated occupant.

Note: - The designated seating position must be qualified by the child or adult percentile and the male or female sex.

designated position: any position intended by the manufacturer and assembler to provide accommodation in a vehicle in service for a person at least as large as a 5th percentile adult female.

Note: - Designated seating positions can be specified for a particular percentile. Example: the bench seat must provide two designated seating positions for a 50th percentile male adult.

normal occupants' weight: weight obtained by multiplying the number of occupants specified at assembly by 70 kg.

gross vehicle weight (GVW): value specified by the manufacturer or assembler for predetermined operating conditions.

Note: - The gross vehicle weight corresponds to the total of the loads on the wheels of a motor vehicle in working condition, including accessories, equipment and the normal occupants' weight (i.e. a minimum weight of 700 kg for types I and III ambulances; a minimum weight of 450 kg for type II ambulances).

line fuel heater: device used in the feeder circuit of internal combustion engines which prevents paraffin crystals from forming or melts the crystals already formed before they pass through the filter.

first rear axle: the closest axle to the front axle when the vehicle is equipped with rear wheels in tandem.

Note: - See second rear axle.

GVW (abb): see gross vehicle weight.

reserve (abb.: R): a battery's reserve is the time in minutes during which the battery supplies a current of 25.00 A + 0.25 A, at a temperature of -17.8° C + 0.6° C.

heavy duty (syn.: reinforced): characteristic of a piece of equipment that exceeds the normal standards in terms of capacity, quality or quantity.

Note: - Heavy duty equipment refers to the best, most durable and strongest structures, parts and accessories available on the market.

manual operation signal: sound wave emitted by a siren, the frequency of which is amplified until the control is interrupted or the siren's operation limit is reached.

high-low signal: sound wave emitted by a siren, producing a high and low alternate tone with a nominal frequency of between 40 cycles/minute and 60 cycles/minute.

wail signal: sound wave emitted by a siren, producing a tone that increases and decreases automatically and rapidly, with a frequency of between 10 cycles/minute and 30 cycles/minute.

yelp signal: sound wave emitted by a siren, producing a tone that increases and decreases automatically and rapidly, with a frequency of between 130 cycles/minute and 240 cycles/minute.

most effective cooling system: the most comprehensive cooling system which the manufacturer can provide and which will at all times ensure a normal engine operating temperature, regardless of the conditions under which the vehicle is used, particularly over long periods of movement at slow speeds or when the engine is idling or the vehicle is stopped.

vehicle in working condition: a vehicle containing all the standard equipment necessary for operation, including a full tank of fuel (90% or more of its capacity) and full reservoirs of oil and coolant, tires inflated to the pressure corresponding to the authorized gross vehicle weight, with doors and windows closed, excluding removable accessories.

vehicle in service: a vehicle prepared to provide the services for which it was designed and built, with all the intended occupants or the equivalent in the designated positions, as the case may be.

Note: - For testing purposes, occupants may be replaced by equivalent weights in the positions where they are normally found. Similarly, accessories and equipment may be replaced by corresponding weights placed logically in the vehicle. All signal systems required in the normal operation of the vehicle such as the roof flashers and siren must be in working order.

3.2 Explanation of Organization Initials

AMD: Ambulance Manufacturer Division (of TBEA).

ANSI: American National Standard Institute.

BNQ: Bureau de normalisation du Quebec.

SCC: Standards Council of Canada.

CGA: Compressed Gas Association Inc.

IES: Illumination Engineering Institute.

CMVSS: Canada Motor Vehicle Safety Standard.

Note: - These standards are part of the Motor Vehicle Safety Act.

CGSB: Canadian Government Specifications Bureau.

SAE: Society of Automotive Engineers Inc.

TBEA: Truck Body and Equipment Association.

4. CLASSIFICATION

Ambulances are classified in three vehicle type categories depending on the nature of the basic vehicle:

- type I: truck type vehicle, consisting of a cabin chassis to which an ambulance compartment is assembled;
- type II: manufacturer's standard van type of vehicle;
- type III: cutaway van type of vehicle to which an ambulance compartment or a bare chassis is assembled, to which are added a cabin and an ambulance compartment.

(refer to page 4 - Definitions)

5. GENERAL REQUIREMENTS

5.1 Manufacture

The vehicle must be carefully designed and built, as described herein, by the manufacturer and the assembler, taking into account the specific use of the ambulance.

In the course of his work, the assembler must meet the requirements of the vehicle manufacturer and obtain certification, if needed.

5.2 Standard Equipment For The Basic Vehicle

Any equipment specified by the manufacturer as a standard accessory or component of the current-year vehicle models must be supplied by the manufacturer unless otherwise indicated in the purchase specifications.

5.3 National Safety Mark

The national safety mark must be affixed to the vehicle in compliance with the relevant section of the Canada Motor Vehicle Safety Act.

5.4 Compliance With The Acts and Regulations

The vehicles described herein must be fitted out in compliance with all the requirements of the highway safety code enacted by the Government of Nova Scotia and the pertinent regulations.

6. SPECIFIC REQUIREMENTS FOR THE MECHANICAL PARTS OF THE VEHICLE

6.1 Basic Vehicle

6.1.1 For type I ambulances, the basic vehicle must be a motor vehicle of the truck type in the cabin chassis assembly series.

6.1.2 For type II ambulances, the basic vehicle must be a motor vehicle in the van assembly series.

The roof of vans modified to receive a raised roof must be reinforced in order to compensate for a certain loss of rigidity in the walls and roof.

6.1.3 For type III ambulances, the basic vehicle must be a motor vehicle in the cutaway van or bare chassis assembly series.

The basic vehicle in this case can also be any compatible vehicle that has obtained the declaration of compliance and the national safety mark of Canada. In addition, all basic vehicles must be authorized for ambulance use by the manufacturer with the optional elements mentioned herein.

6.1.4 For types I, II and III ambulances, the choice of vehicle for ambulance use must not be subject to a contra-indication on the part of the manufacturer.

6.1.5 For types I and III ambulances, the choice of the chassis, axles, wheels and tires must take into consideration that the vehicle's track must be as large as possible given the overall width of the ambulance compartment to be installed. Dual rear wheels, in tandem or reinforced (coupled), are accepted.

6.2 Power Train

All engine types (gasoline, diesel, propane, etc.) that are part of the manufacturer's standard equipment are accepted.

Engines that have been converted to propane or natural gas must be inspected and approved by an officially recognized organization.

For ambulance purposes, the choice of engine, depending on the fuel, must not be contrary to the manufacturer's recommendations.

6.2.1 Speed:

The vehicle must be capable of maintaining, on flat ground, a minimum cruising speed of 110 km/h for 30 minutes, and reaching, when required, a passing speed of 125 km/h.

6.2.2 Fuel Tank

6.2.2.1 Gasoline or Diesel-Powered Vehicles:

Each vehicle must have, in addition to the regular gasoline or diesel tank (60 litres or more), an auxiliary tank with a minimum capacity of 60 litres. A large-volume tank with a minimum capacity of 110 litres may be used instead of these tanks.

6.2.2.2 Propane or Natural Gas Vehicles:

Vehicles that run on propane or compressed natural gas must have a tank with anti-corrosion protection and a minimum capacity of 110 litres corresponding to 70% of total capacity. All indicators specific to these systems are mandatory. The requirements set out in CAN/CGA B149.1-M86 and CAN/CGA B149.2-M86 must be met.

6.2.3 Indication of Fuel Type:

For vehicles that run on unleaded or diesel gasoline, labels specifying the type of fuel to be used must be affixed near the fuel tank filler cap(s).

6.2.4 Exhaust Pipe:

The exhaust pipe exit must be located on one side of the vehicle and, if on the right, it must be behind the side door of the ambulance compartment.

For types I and III ambulances, the distance between the projections on the horizontal plane between the exhaust pipe exit and the port of the fuel filler pipe must be at least 150 mm.

6.2.5 Engine Cooling System:

The engine must be fitted with the most effective cooling system offered by the manufacturer. This system must allow the ambulance vehicle to function normally for 40 minutes, evaluated in relation to sea level and at a room temperature of 35° C.

Unless the manufacturer makes a specific recommendation, the cooling liquid must be an ethylene glycol solution able to withstand a temperature of -37° C.

6.2.6 Engine Block Heater:

Vehicles with a gasoline engine must have an immersion-type engine block heater with a power rating of at least 400 W and a voltage of 120 V AC, and be fitted with a cable and plug.

Diesel engines must have two engine block heaters with a power rating of at least 400 W each or an equivalent provided by the manufacturer, and be fitted with a cable and plug.

6.2.7 Fuel Preheating System:

Diesel engine vehicles must be fitted with a built-in fuel preheating system placed above the filter.

6.3 Propulsion System

6.3.1 Transmission:

The transmission must be automatic and have an effective complementary or auxiliary oil cooling system that is separate from or built into the regular system.

6.3.2 Differential:

Depending on the characteristics of the engine and transmission, the differential must have an axle ratio that makes it possible to achieve the cruising speeds indicated in section 6.2.1. It must be a limited slip differential.

6.4 Suspension

6.4.1 Components:

Each component of the basic vehicle suspension (springs and shock absorbers) must be designed according to the GVW of the fitted-out vehicle in service. In addition, the components chosen must provide the softest ride possible on the model offered by the manufacturer.

6.4.2 Shock absorbers:

The front and rear shock absorbers must be of the dual action type and, subject to section 6.4.1, they must be the strongest that the manufacturer can provide.

6.4.3 Stabilizer bars:

The basic vehicle must be fitted out with anti-roll or torsion bars at the front. It must also be equipped at the rear if the manufacturer can supply them as an option.

6.5 Steering and Wheels

6.5.1 Power steering:

The steering must be power-assisted.

6.5.2 Wheels:

Rims and mounted tires as well as one (1) spare tire of the same brand, type and dimension, all in compliance with the specifications of The Tire and Rim Association Inc., must be provided on delivery.

6.5.2.1 Tires:

The tires must be of the radial type, of guaranteed first-quality construction, according to the GVW of the fitted-out vehicle in service and comply with section 120 of the CMVSS. Tires must be of the "LT" series.

Note: - During the winter period or if otherwise required, the vehicle must be delivered with winter tires.

6.5.2.2 Rims:

The rims must be heavy duty and compatible with the tires. They must allow for ventilation of the brakes.

6.6 Brakes

6.6.1 Service Brakes:

The brakes must be power-assisted.

The power booster and the brake linings must be the most heavy-duty and of the best quality offered by the manufacturer for the vehicle in question.

Taking into account their usage and frequency of use, the brakes must be fitted with a ventilation and cooling system (Vanes or equivalent) that can dissipate as much accumulated heat as possible within a short period of time. They must have the largest friction lining areas that the vehicle manufacturer can provide.

6.6.2 Parking Brakes:

The parking brakes must be of the mechanical friction type and have an indicator to show operation or have an automatic release device. Parking brakes must not be hydraulic. They must be independent of the service brakes, in compliance with the requirements in section 105 of the CMVSS.

6.7 Vehicle Electrical System

The vehicle system must supply a minimum voltage of 12 volts.

6.7.1 Alternator:

The alternator must produce power corresponding to the requirement of the expected nominal continuous electric charge. However, the alternator must not produce a load of less than 135 A, 14 V when the engine is running at 40% of its maximum capacity and of less than 60 A, 14 V when idling, when the temperature under the hood is approximately 94 ° C. The heavy duty construction must mechanically and electrically sustain the peak speed for 30 minutes. The alternator must be installed by the manufacturer, if possible.

The alternator must be driven by one or two appropriate belts with a capacity greater than or equal to 1.5 times the normal load.

The vehicle must be fitted with an automatic low-speed accelerator in order to obtain the minimum load required.

The entire electrical system must be compatible with the maximum power of the alternator installed.

6.7.2 Vehicle Battery:

Vehicles with a gasoline or propane engine must have one battery, while vehicles with diesel engines must have 2 identical batteries, in accordance with the manufacturer's recommendations.

Each storage battery provided must have a minimum CSA capacity of 450 and a minimum reserve (R) of 115 minutes, as measured according to standards SAE J 537 JUN 86. The battery must be of the sealed and maintenance-free type.

A battery with a minimum CSA capacity of 1025 and a reserve (R) of 160 minutes can replace the two batteries mentioned in vehicles with diesel engines. It can be of the commercial type with maintenance required.

The battery or batteries must be located outside the cabin and the section fitted out for patients, in a ventilated area and be easily accessible for inspection and maintenance.

Note: - The characteristics of batteries for ambulance use, referred to as auxiliary batteries, are described in section 8.7.1.

A diode equalizer must be installed.

6.7.3 Headlights:

The vehicle must be equipped with halogen high beam headlights.

6.8 Dashboard

6.8.1 Indicators and Lights:

The indicators, whether of the dial, numerical or analoque type, must show the engine temperature, engine oil pressure and alternator load.

Note: - Warning lights alone are not acceptable for these indicators.

6.8.2 Speedometer

The speedometer must be calibrated in kilometres per hour (km/hr).

6.8.3 Door Ajar Indicator

An indicator must show whether any door of the ambulance is open.

6.9 Hood Release

The hood must be released only from inside the cabin. The latches must meet the requirements of section 113 of the CMVSS.

6.10 Thermal Insulation of Hood

The hood inner panel must be insulated against changes in temperatures. This insulation must be made by the manufacturer or the assembler, according to the manufacturer's recommendations and authorizations.

6.11 Tools

A good-quality jack of sufficient capacity and a nut wrench or heavy duty cross lever must be provided by the manufacturer according to the GVW of the vehicle. A four-post lug nut wrench is to be supplied with the vehicle on final delivery.

7. SPECIFIC REQUIREMENTS FOR THE VEHICLE CABIN

7.1 Floor Covering

The surface of the cabin floor and steps must be covered with a flame-retarded coating with a high-strength vinyl or rubber or other equivalent.

The surface of the wall separating the cabin from the engine must also be covered with this or a better quality coating.

7.2 Cabin Seats

The cabin must consist of a two seat passenger compartment. The seat must be of the best quality bucket type that the manufacturer can provide for serial equipment. If required, the seats can be ergonomic, that is with or without pneumatic suspension regulating the seat height and with an automatic height regulating systems by way of vibrations causing it to go up or down.

The cabin seats and their anchorages must comply with section 207 of the CMVSS.

7.3 Armrests

Armrests must be attached to the side front doors of the vehicle.

7.4 Cabin Lighting

The cabin interior must be equipped with a light system of a minimum of 375 lux covering over 90% of the seat surface. There must also be a directional light system of the same intensity within reach of the occupant of the front seat next to the driver.

7.5 12 V DC Outlet

In order to operate certain equipment, a 12 V DC cigarette lighter-type outlet provided by the manufacturer must be installed on the vehicle dashboard.

7.6 Hand-Held Floodlight

A hand-held floodlight, with an auto-release trigger switch, producing non-glare light of approximately 3000,000 cd, must be permanently connected to the vehicle's electrical system. It must be retained by a support secured inside the cabin within reach of the occupants.

The electric wire, of approximately 2 metres in length, must be of the spring-wound filament type.

7.7 Radio

An AM/FM radio must be installed in the ambulance cabin. The speaker system in the cabin and the ambulance compartment must be controlled separately from these two areas.

7.8 Adjustable Steering Wheel (Optional)

The vehicle may be equipped with an adjustable steering wheel if it is offered by the manufacturer.

7.9 Automatic Speed Control (Optional)

The vehicle may be equipped with an automatic speed control device from the manufacturer.

7.10 Tachograph

A computerized tachograph must be installed in the vehicle. It must at least be capable of continuously compiling vehicle speed, the travel time, time of movement at slow speeds, stopping time, kilometres travelled, peak accelerations and decelerations, braking and use of turn signal lights and the main emergency light.

7.11 Cabin Heating

The heater in the cabin must guarantee the maximum power that the manufacturer can provide for this type of vehicle (see section 8.7.9 as well).

7.12 Insulation

The cabin floor and interior fittings for this vehicle must have thermal protection meeting the manufacturer's highest standards.

7.13 Windows

The windshield, as well as all cabin windows, must be made of tinted glass and comply with section 205 of the CMVSS.

7.13.1 Front Door Windows:

The front door windows must be entirely concealed within the doors when they are in the fully-open position.

7.13.2 Windshield Washer and Windshield Wipers:

The washer pump must be power-assisted. The washer nozzle must spray at least one jet for each windshield wiper. The washer reservoir must be the largest offered by the manufacturer for this vehicle. The windshield wipers must operate at two speeds at a pulsed frequency.

7.13.4 Sun Visor:

Two padded and flame-retarded sun visors are required, one for each designated seat in the cabin.

7.14 Outside Rear-View Mirrors

For types I and III ambulances, one large-size (330 cm^2 minimum) pivoting and lockable plane outside rear-view mirror must be installed on each side of the cabin, in compliance with section 111 of the CMVSS regulations. For type II ambulances, the mirrors must be at least 150 mm by 170 mm in size. Both mirrors must be regular type and reflect an actual size image.

A circular convex mirror, measuring at least 150 mm, must be added in the area of the plane mirror. A rectangular convex mirror, of 150 mm, can replace the circular convex mirror if its surface has a curvature at least equal to that of the circular mirror.

The mirror support must be secured to the upper and lower frames of the door window.

8. SPECIFIC REQUIREMENTS OF THE AMBULANCE COMPARTMENT

8.1 Body

8.1.1 Construction

8.1.1.1 Structure:

The ambulance compartment structure must be able to support 1.5 times the weight of the vehicle in working condition, as described in the test methods for school buses in section 220 of the CMVSS regulations.

For non-metal roofs, wire netting must be installed on the entire roof surface to provide a ground plane for the radio antenna.

8.1.1.2 Anchorage of Compartment:

For types I and III ambulances, the ambulance compartment must consist of a unitized unit which is anchored to the chassis of the vehicle with at least 5 bolts on either side, in accordance with the recommendations of the chassis manufacturer.

The fastening devices must be installed so as to minimize noise from the body of the vehicle.

8.1.1.3 Wall Reinforcement:

A lengthwise metal reinforcement of at least 100 mm X 5 mm must reinforce the walls of the ambulance compartment midway between the floor and roof of the ambulance compartment. Reinforcing bars are not to be placed in the side or rear doors.

8.1.1.4 Distribution of Weight:

The vehicle must be assembled in such a way that the front axle supports from 30% to 50% of the weight of the vehicle in working condition. Similarly, the loads on one side as opposed to the other must show a difference of less than 5%. A compensating weight must not be used to meet the distribution requirements.

8.1.2 Dimensions

8.1.2.1 Front Partition of Ambulance Compartment:

The open space between the front partition of the ambulance compartment and the average plane of the vehicle dashboard opposite the driver must be at least 1,100 mm at floor level and opposite the steering wheel.

8.1.2.2 Interior Height:

The interior of the ambulance compartment must have a minimum finished height, after fitting out, of 1,500 mm.

8.1.2.3 Interior Length:

The length of the floor of the ambulance compartment between the rear door and the partition separating the cabin from the ambulance compartment must be at least 2,650 mm for type II ambulances and at least 3,100 mm for types I and III ambulances.

8.1.2.4 Interior Width:

The width of the ambulance compartment must be, after fitting out the open space between the vertical side of the stretcher and the side of the lengthwise bench, at least 300 mm for type II ambulances and 400 mm for types I and III ambulances.

8.1.2.5 Exterior Dimensions:

The ambulance in working condition must have a height of less than 2,650 mm, a width (vehicle dimensions code: W103*) of less than 2,440 mm and a length (vehicle dimension code: L103*) of less than 6,700 mm.

8.1.2.6 Floor Level of Ambulance Compartment:

The distance between the finished floor level of the ambulance compartment and the support plane of the vehicle allowing the patient to enter the ambulance in working condition (vehicle dimension code : H106*) must be less than 840 mm for types I and III ambulances. For type II ambulances and 4" X 4" ambulance vehicles, this distance must be smallest possible, taking into account the basic vehicle.

8.1.2.7 Road Clearance:

(Vehicle dimensions code : H157*) - The road clearance must be more than 160 mm when the ambulance is in working condition. The open distance between the contour of the body and the support plane of the vehicle must be at least 200 mm. For the "all terrain" or 4" X 4" version, the road clearance must have a minimum value of 250 mm.

8.1.2.8 Angle of Approach and Departure and Ramp Breakover Angle:

The ambulance in working condition must have an angle of approach (vehicle dimensions code : H106*) of more than 20° and an angle of departure (vehicle dimensions code: H106*) of more than 10° . For the "all terrain" or 4" X 4" version, the angles of approach and departure must have a minimum value of 30° .

8.1.3 Accessories

8.1.3.1 Rear Bumper and Steps:

A rear bumper is required at the back of the ambulance. If the distance from the floor of the ambulance compartment to the support plane of the vehicle is greater than 440 mm, a step of the width of the opening of the rear doors is required. This step must be located 50 mm above the midway distance between the floor level and the support plane. The riser must be at least 125 mm high and the tread, at least 250 mm deep. The bumper and step must be capable of supporting a 225 kg load without deflection.

8.1.3.2 Side Steps:

For type I ambulances, the cabin steps must be replaced by continuous steps from the front fenders to the rear fenders. They must be heavy-duty and of the same depth as the existing steps.

8.1.3.3 Side Door Steps:

Steps are necessary if the distance between the floor level and the support plane of the vehicle is greater than 440 mm in front of the side door of the ambulance compartment. The first step can be the cabin's continuous side step. The risers must be between 400 mm and 450 mm high for types I and III ambulances and up to a maximum of 550 mm high for type II ambulances and 4" X 4" ambulance vehicles. If necessary, steps can be placed inside the ambulance compartment.

8.1.3.4 Bumper Protector:

A rubber protector is required on each corner of the bumpers.

8.1.3.5 Splash Guard:

Front and rear splash guards of the width of the tires are required.

8.1.3.6 Non-Skid Surface:

All surfaces used for stepping into the vehicle are to be coated or covered with non-skid surfacing.

8.2 Floor

8.2.1 Structure:

The rigid, rot-proof, fireproof floor of the ambulance compartment must include a metal 1.5 mm subfloor. The metal subfloor must be sealed along its entire contour. It must be capable of supporting a uniform load of 7 kPa without any deformation. It must be covered with marine-type plywood for outside use with a minimum thickness of 19 mm attached with metal screws or bolts no more than 50 cm apart in both directions. If the plywood cannot be secured to the floor over the fuel tank or other detrimental equipment, it must be anchored by equivalent means.

8.2.2 Floor Covering:

The plywood must be covered with non-skid flooring with a co-efficient of static friction greater than or equal to 1.0, as measured using the test method described in CGSB standard 1-GP-192.

It must not propagate combustion nor contain smoke inhibitors.

It must contain a protective bacteriostatic substance along the surface to guard against positive and negative microorganisms. Its water absorption factor must be lower than 2%.

It must be capable of being used between -20 degrees C and +60 degrees C.

A vertical border with a height of 125 mm must extend along the floor covering with or without seams welded along the entire length of the vertical walls when assembly permits. When borders cannot be placed, the covering must be sealed.

8.3 Walls

8.3.1 Thermal and Acoustic Insulation:

The walls of the ambulance compartment, including the rear and side doors as well as the floor and ceiling, must be thermally and acoustically insulted. Similarly, the wall separating the cabin from the area where the motor is located must be insulated.

A material recognized to be fireproof must be used. Its flammability must be lower than 101 mm per minute, in compliance with the test methods mentioned in section 302 of the CMVSS.

From an acoustic point of view, the insulation must ensure a sound level of under 80 decibels in the cabin, as measured according to the AMD 006 method.

The insulating material used must not emit toxic vapours if it burns, in compliance with section 302 of the CMVSS.

Note: - Insulation must be R-6 or better, rigid styrofoam is not acceptable.

8.4.1 Door Dimensions

The types I and III ambulance compartments must have a door on the right-hand side at least 650 mm wide and 1,625 mm high, which opens out in the opposite direction to the running of the vehicle. For type II ambulances, the side doors must be the closest to the dimensions based on what the manufacturer of the vehicles is able to offer. In the rear, a two-leaf door must open out to leave a space at least 1,100 mm wide and 1,200 mm high.

8.4.2 Hinged Doors

The leafs of the rear door and those of the right side door must have piano hinges. In compliance with section 206 of the CMVSS, the doors and their hinges and the mechanism must be solidly designed to provide for repeated use. A weatherproof joint is required along the perimeter of each door.

The door handle and the inside and outside locks must be of the non-protuberant type.

All these doors must open at all times and be bolted from the inside without a key. All the ambulance compartment's doors, including those of the cabinets, must accept the same key. The battery compartment must be bolted with a different key.

To attract attention, white or red reflecting tape must be glued on each door end surface when they are open, and a circular red reflector with a 75 mm diameter must be installed on the inner face in the lower third ...

The minimum opening of the rear door leafs must be 120° ; a special external device must hold these doors in the fully-open position without restriction.

8.4.3 Door Drip Moulding:

The side door and the rear door of the ambulance compartment must be equipped with drip mouldings at least 50 mm wider than the doors on each side.

8.4.4 Door Windows:

Each leaf of the rear door and the side door must be equipped with a window with a surface area of at least 0.20 m^2 located in the upper third.

Note: - Rear door windows must be sealed.

8.4.5 Removable or Fixed Windows:

For types I and III ambulances, the side windows must be sliding. For type II ambulances, the side windows must be pivoting or sliding, according to what is offered by the manufacturer.

8.4.6 Tinted Glass:

All windows in the ambulance compartment must be made translucent by tinting.

All the windows in the ambulance compartment must meet the requirements of section 205 of the CMVSS.

8.5 Front Partition of Ambulance Compartment

This partition must have a full height walk-through with a sliding or hinged door that locks from both the ambulance compartment and the driving compartment. The door must have a window which will allow visibility from the front to the rear.

8.6 Ambulance Compartment: Equipment and Components

The ambulance compartment must be equipped, among other things, with a medical cabinet, a lengthwise bench, a front attendant seat, stretcher tie-downs and a compartment for oxygen cylinders.

8.6.1 Medical Cabinet

8.6.1.1 Structure:

A medical cabinet, made of plywood with grooved or welded joints or of metal with welded joints or any other appropriate and suitable material, must be solidly constructed and must comply with the required characteristics of the finished product and be capable of withstanding the vibrations of the vehicle. If it is made of wood, all parts of the structural frame, front and uprights must be of plywood at least 15 mm thick. Moreover, it must be solidly secured at least three points to a part of the metal structure: at the floor and roof of the ambulance compartment, over more than 50% of its length by means of corner posts, and at the stiffeners of the left-hand wall of the ambulance compartment.

8.6.1.2 Finish:

The surface of the exposed portions must be smooth and soft to the touch and not show any traces of mechanical machining. The cabinet must have no sharp projections.

8.6.1.3 Volume:

The cabinet must have a minimum storage volume of 450 cubic decimeters (eg: 25 cm X 120 cm X 150 cm)

8.6.1.4 Assembly:

The upper portion of the medical cabinet must open at the front by means of panes made of plastic such as polycarbonate plastic which is shatter-proof and shock-resistant. These doors must slide effortlessly on tracks over their entire length. They must comply with section 205 of the CMVSS.

The lower portion of the medical cabinet must be solid to a height of approximately 350 mm.

The shelves must have a raised edge of approximately 15 mm high and be designed to receive transparent vertical separators which can be arranged according to the user's needs.

8.6.2 Lengthwise Bench:

A lengthwise bench with at least 2 designated seating positions must be securely attached to the right-hand side of the ambulance compartment. For types I and III ambulances, the seat back must be fixed; for type II ambulances, the seat back can be fixed or turned down.

Lap belts are required for each designated seating position. The bench and the seat belts must comply with sections 207, 208, 209 and 210 of the CMVSS.

The bench seat must be 450 mm + 50 mm high and at least 450 mm deep. The seat back must be 450 mm high.

It must be easy to place a Ferno-type stretcher (model 107c) on the bench. Stretcher supports, called wheel cups and post cups, must be provided at each end of the bench. A system of 3 safety belts must be provided to hold the stretcher and the patient securely in place. In principle, no buckle should touch the body of a patient on this stretcher.

The bench seat must be secured with hinges over the length of the bench so that the area under the bench can be used to store vehicle equipment and ambulance accessories. Moreover, it must be fitted with a sturdy tie-down system to prevent it from opening accidentally.

8.6.3 Attendant's Seat:

A bench in the rear must be installed forward of the main stretcher, with one designated seating position fitted with a lap belt. The front of the seat must be located between 600 mm and 750 mm from the head of the stretcher. The bench and seat belts must comply with regulations and sections 207, 208, 209 and 210 of the CMVSS.

The seat must be approximately 425 mm + 25 mm high, at least 450 mm + 20 mm wide and approximately 450 mm deep. The seat back must be at least 500 mm high.

A headrest at least 250 mm high and 350 mm wide, the centre of which is 750 mm away from the seat, is required.

The seat and seat back must be covered with washable and easily maintained materials. The polyurethane foam padding approximately 50 mm thick must comply with section 302 of the CMVSS.

8.6.4 Main Stretcher Tie-Down:

A 175-4 model Ferno Washing type stretcher tie-down for types I and III ambulances and a model 175-5 for type II ambulances must be secured with appropriate metal structural elements to the base of the walls of the medical cabinet or to the floor. The fastener used to secure the stretcher to the wall or floor must not depend on the capacity of the panel at the bottom of the medical cabinet. The tie-downs must be installed in accordance with the requirements of standard AMD 004. The tie-downs must be installed with the equipment, according to the conditions expected, in the location stipulated by the manufacturer.

The stretcher tie-down must be positioned so an open space of approximately 30 cm is left between the stretcher, when in place, and the rear doors.

8.6.5 Handrail:

A circular handrail with a diameter of 25 mm + 3 mm and a length of approximately 1.5 metres must be attached lengthwise to the ceiling of the ambulance compartment opposite the centre of the main stretcher. It must be able to withstand pulling of 100 kg.

Note: - In low-rise vans, soft grab handles are to be mounted on the ceiling of the ambulance in place of the metal handrail.

8.6.6 Intravenous Equipment Support:

At least 3 supports for I.V. equipment must be installed at the ceiling level. One at the centre of the main cot, one at the head of the main cot, and one at the head of the bench seat. These supports must have restraining straps for I.V. bags/bottles. When not in use, these supports must be retractable.

8.6.7 Location of Oxygen Cylinders:

A holder capable of securing one in use type "E" oxygen cylinder and one type "D" oxygen cylinder must be placed in the ambulance compartment. It must be in a location that will allow the "E" type oxygen to be used for in car treatment of the primary or secondary patient.

A holder capable of securing an "M" or "S" type oxygen cylinder in a horizontal position must be placed under the bench seat in the ambulance compartment. This holder should be able to store various types of oxygen tanks which may be up to 230 mm in diameter. The holder shall have a clear plastic access door for reading pressure gauge and turning on tank valve.

All oxygen tank holders must be so designed and mounted that a high-force collision will not result in the cylinders being torn from its mounting.

Easy access is necessary to facilitate loading and unloading of the oxygen cylinders and their use at all times. The manometer that is attached to it must be visible from all the designated seating positions in the ambulance compartment.

Note: - Aluminum oxygen cylinders are preferable.

8.6.8 Oxygen Distribution Line Network:

The oxygen line must consist of pipes bearing the MED mark according to the Food and Drug Act of Canada. If copper pipes are used, they must be of the "L" type as defined by the ASTM B88. All the connections used to assemble copper pipes must be made of copper, brass or wrought iron and be manufactured in accordance with a brazing connection.

The network must be supported by pipe hooks, the composition of which is compatible with that of the pipes so as to prevent the pipe from moving from its initial installation position or vibrating when the vehicle is moving. The outlet as such for oxygen taking and its standard dimension must comply with standard V-5-1978 of the Compressed Gas Association.

One (1) oxygen outlet is to be provided on the stretcher wall near the patients head. This outlet is to be fitted with a connection which will accept a flowmeter with a screw-thread connector.

The oxygen cylinder release systems must meet the test requirements of standard AMD 003.

Any channel of oxygen that could come into contact with an electric wire must be protected or separated from it by a fireproof product. These channels must have a minimum play of 200 mm to facilitate connections.

The oxygen distribution network must be airtight and meet the requirements of the static pressure test of standard AMD 003.

8.6.9 Suction Apparatus:

Space is to be provided on the stretcher wall for the mounting of a portable electric suction unit which will be used for in-vehicle suction. A 12 volt electrical outlet is to be provided for the charger for this suction.

8.6.10 Location of Spare Tire:

Space outside of the ambulance compartment must be provided for the spare tire. This space must allow easy, permanent use of the wheel positioned there without having to move the stretcher.

8.7 Electrical System in the Ambulance Compartment

The electrical system in the ambulance compartment must be separate from that of the basic vehicle. It must be connected to that of the basic vehicle by a junction block with a capacity exceeding 125% of the expected load.

8.7.1 Auxiliary Battery

8.7.1.1 12 V DC Auxiliary Circuit:

One or more additional batteries, in the same number as and identical to the standard vehicle batteries, must be added to the ambulance electrical circuits.

These batteries must normally be located outside the body (cabin and ambulance compartment).

They must be connected to the regular vehicle circuits by cables with a capacity equivalent to or greater than the standard SAE No. 2 cable, as specified in standard SAE J 1127 JUN 80.

The auxiliary battery or batteries must be positioned so as to minimize the height of the ambulance vehicle's centre of gravity.

These auxiliary batteries must be permanently connected to the charging system of the vehicle battery or batteries, and have a protective circuit that does not allow reverse current (discharging) other than by means of a selector.

8.7.1.2 Battery Selector:

A battery selector with a 200 ampere capacity must be installed within easy access to the driver.

The light system visible to the driver must indicate the selector setting unless the selector commands can be seen by the driver in a normal driving position.

An automatic battery selector is accepted.

A permanent display unit of the battery selector's setting must be positioned within view near the selector.

This battery selector must allow the following connections to be chosen:

a) to the vehicle batteries;
b) to the auxiliary batteries;
c) to all batteries;
d) to none of the batteries (selector in the "off" position)

8.7.1.3 Battery Recharging Circuit:

All the batteries must be rechargeable at all times, regardless of the battery selector position.

A SCHOTTKY* diode must be installed in each recharging circuit so as to prevent the current from returning by these circuits. The diodes must be able to support a minimum inverse voltage of 45 V and a current equal to 1.25 times the maximum recharging current.

8.7.2 Anti-interference Radiocommunications System

If offered by the manufacturer, an anti-interference device for the radiocommunications system designed to reduce the electromagnetic radiation produced by the electronic engine ignition system must be installed in the vehicle. Any other anti-interference device must be installed when the electric and electronic equipment is installed to counter the interferences of the ambulance compartment's medical telemetric systems.

8.7.3 Signalling System

* From Walter Schottky, German physicist (1886)

8.7.3.1 Siren:

A siren with at least 4 sound ranges is required: direct, high-low, wail and yelp signals. It must provide at least 120 dBA on the sound level meter positioned 1.25 m from the ground and 3 m in front of the vehicle, in a band frequency of between 500 Hz and 2000 Hz for the wail and yelp signals. It must be activated at the driver's option from the vehicle's horn command.

The siren speakers must be embedded in the front grille of the vehicle and should not protrude in front of the bumper.

8.7.3.2 Public Address:

An electronic audio amplification system within access of all the occupants of the cabin is required for addressing the public. It must be connected to the siren speakers.

8.7.3.3 Flashers:

All flashers indicated below must operate at temperatures ranging from -- 50 degrees C to 70 degrees C. They must be red and comply with the specifications of standard SAE J 578 d.

8.7.3.3.1 Main Emergency Light:

A bar style rotating emergency light incorporating the colors red and white is to be mounted on the roof of the cabin. It is to be an "all-light" style with no centre cut out for a speaker. This light is to be angled 5 to 10 degrees downward from horizontal towards the front of the vehicle. (see figures 1 and 2, location A)

8.7.3.3.2 Rear Flashers:

Two (2) high-intensity lights are to be mounted on the rear of the vehicle facing rear-ward (see figures 1 and 2, location D).

8.7.3.3.3 Side Flashers:

Red flashing high-intensity lights must be placed at the forward end of each front fender as intersection lights; on raised roof units, an additional two (2) red flashing lights are to be mounted on the side of the vehicle roof. (see figure 1, position E and figure 2, positions E & G).

8.7.3.3.4 Forward Warning Devices:

Two forward warning devices incorporating grille flashing red lights and siren speakers are to be mounted on the vertical plane of the grille and protected from impact. (see figures 1 and 2, position F).

8.7.3.3.5 Alternating Head Lights:

The headlights shall be wired to flash alternately on high beam. The headlight flasher will cancel when high beam is engaged.

8.7.3.3.6 Backup Alarm:

This signal must be capable of warning bystandars in the event that the driver's vision is impaired when the ambulance is backing up and shall be provided with a manual automatic reset disable control (the alarm will reset when gear shift lever passes neutral).

8.7.3.3.7 Rear Amber Warning Light:

One (1) amber light of the same style as the rear red flashers is to be installed on the roof of the vehicle facing rearward to flash with the secondary warning system. (see figures 1 and 2, location H).

8.7.4 Outside Lights for Work Area

Wide-diffusion lights must be installed outside the ambulance compartment in order to light the outside work zone. Two (2) lights are required on each side of the compartment, two (2) are required at the rear which is 2 metres wider and one (1) light is required for a compartment which is 2 metres wide or less. These lights with a minimum force of 100,000 cd each must be positioned on a plane perpendicular to the wall and be oriented toward the ground at an angle of 10 to 15 compared to the vertical plane (see figures 1 and 2, location zones B and C).

The lights must be grouped into 3 independent circuits; on the left-hand side, the right-hand side and the rear of the ambulance compartment. Each circuit must be controlled separately by a switch from the cabin console.

The lights on the right-hand side and at the rear of the compartment must turn on automatically when the side door and the rear door are respectively open. The rear lights should go on when the vehicle is backing up.

All scene lights shall be installed to flash in an alternating fashion as part of the primary emergency warning system. (see figures 3 and 4).

8.7.5 Dome Lights:

Dome lights giving a minimum white light of 350 lux (1 lux = 1 lumen per square metre) over more than 80% of the length at stretcher height must be installed in the ambulance compartment.

They must have at least two intensities: low and high.

All the components of the dome lights' electric accessories must comply with SAE standards J 575 JUL 83 and J 576 NOV 81.

Dome lights must not protrude from the ceiling surface by more than 30 mm.

They must be activated at high and at low intensity from the cabin console. When the rear and side doors are opened, the dome lights must be activated at low intensity and turn off automatically 10 seconds after the doors are closed.

8.7.6 Motor Vehicle Electrical Circuits

8.7.6.1 Electric Wires:

All 12 V DC electric wires must be made of standard copper wire for SAE J 1128 SXL-type automobiles, with a capacity of 1.25 times the normal protected load. All wires must be suitably marked with an alphanumeric code located at least every 150 mm along the wire and recorded in a reference guide near the electrical panel.

All the junctions or connections must be in accessible, enclosed protected locations. All the electric wires must be suitably attached to the vehicle body at least every 300 mm. When crossing rigid walls, they must pass through rubber rings. Moreover, no electric wire, except for those required for oxygen use, must pass within 20 cm of the oxygen cylinders or in the oxygen distribution compartment.

8.7.6.2 Circuits with relays:

All main circuits must be fitted with switches with relays so as to minimize the length of the wires transporting high intensity current.

Moreover, the circuit design and the choice of components should be such that they minimize the electric charge.

8.7.6.3 Electric Panels:

All 12 V DC electric circuits must be connected in a central electrical panel and protected with type 1 circuit breakers in compliance with standard SAE J 553c.

All 120 V AC electric wires must be connected to a central electric panel separate from the 12 V DC panel. These circuits must comply with standard CSA C 22.10-1987 and special local amendments, as applicable.

These electrical panels and their components (circuit breakers, relays, etc.) must be easily accessible at all times and preferably be located near the front bench. The bottom of the door to the electrical panels must be at least 150 mm from the ambulance compartment floor to prevent any water from intruding.

The inside of the electrical panels must be made of fireproof materials.

8.7.6.4 Driver Console:

A console in the cabin, handy and visible to the driver, is used to control the ambulance siren and flashers. This console must not be more than 75 mm above the lowest portion of the top of the vehicle dashboard.

A switch is used to control the lighting circuits outside the ambulance compartment, whether they are activated automatically when the doors are opened or controlled from the ambulance compartment console.

All these control devices clearly marked using a 12-point lettering system, must be lit from a rheostat. They are:

S.1. Master switch shall control all conversion components.

S.2. Light bar.

S.3. All emergency warning flashers (two-stage, primary and secondary).

S.4. Alternating headlight flasher.

S.5. Left flood lights.

S.6. Rear flood lights.

S.7. Right flood lights.

S.8. Siren/horn (2 stage).

S.9. Back-up alarm.

S.10. Battery booster (momentary).

S.11. Spare (anti-theft device if installed).

S.12. Rear compartment heater.

S.13. Rear compartment lights.

S.14. Spare.

The driver console shall also include:

- the siren control box. The siren must be removable for servicing without disturbing other components.
- volt-meters for main and auxiliary batteries.
- "door open" warning light.
- silent intercom warning light. This light must be installed so as to be visible only to the driver.

8.7.6.5 Ambulance Compartment Console:

A console in the cabin, handy and visible to a potential occupant of the front bench and within view, that is between the top half of the stretcher and the front bench, must contain the individual switches for all the electrical circuits inside the ambulance compartment. This console must be recessed so that no control switches protrude above the housing. All the switches must have a minimum capacity of 25 A, with a pilot light.

S.15. Left bank of interior ceiling lights (2-stage).

S.16. Right bank of interior ceiling lights (2-stage).

S.17. Heater (off, low and high).

S.18. Cabinet lights.

S.19. Ventilation/exhaust (2-stage).

S.20. Air conditioning.

If the heater and air-conditioning (S.17 & S.20) are unnecessary due to thermostat control, S.17 shall be deleted and S.20 shall become a spare. S.12 shall become main power for heating/air conditioning.

Note: - "S" means switch.

8.7.6.6 12 V DC Socket:

One SAE J 536b 12 V DC cigarette lighter-type socket connected to the 12 V DC vehicle circuit, protected for 20 amperes and equipped with a SCOTTKY diode. This will be charger plug for in vehicle portable suction.

8.7.6.7 12 V DC to 117 V AC Converter:

If required, it must be possible to control a 12 V DC to 117 V AC converter with a frequency of 60 Hz $\pm$ 4 Hz providing at least 500 watts at 90% of its charge from the consoles of the ambulance compartment. The converter must comply with the characteristics in standard KKK-A-1822c.

The converter must feed only the circuit of clearly indicated 120 V AC sockets. No circuit other than these sockets must be fed by this converter.

A relay switch must disconnect the converter when the exterior feed system is under pressure and must feed the sockets.

8.7.6.8 120 V AC Exterior Socket:

If required, there must be an exterior 120 V AC socket.

If an exterior socket is installed, it must be a single 5-15P type 120 V AC "male" socket with at least 15 A in aluminum, with a waterproof cover. It must be located outside the ambulance compartment, near the cabin door on the driver's side.

Note: - Type 5-15P is defined in ANCI C73-1980

This exterior socket may be replaced by an automatic-rewind extension cord with its accessories ready for connection.

8.7.6.9 120 V AC Circuit:

If installed, the exterior 120 V AC socket and the 12 V DC to 117 V AC converter are the power sources.

The 120 V AC electrical system distribution unit must be separate from the 12 V DC distribution box. A 15 A differential circuit breaker* must protect the circuits at entry. The equipment and circuits must comply with the Canadian Electrical Code CSA C22.10-1987.

8.7.6.10 120 V AC Sockets:

The ambulance compartment must have 2 5-15R 120 V AC standard double sockets with at least 15 V. One socket must be installed within reach of the occupant of the front bench and the other must be installed in the rear third of the ambulance compartment.

Note: - Type 5-15 P is defined in ANSI C73-1980.

8.7.7 Ambulance Compartment/Cabin Communication System

An intercom system of the telephone type or a flashing signalling system, handy and visible to the personnel in the ambulance compartment, must permit communication between the driver and the occupant of the front bench.

8.7.8 Air Conditioning and Heating:

The cabin and ambulance compartment must be equipped with an air conditioning and heating system that can operate separately from the separate thermostat controls and reach in less than 30 minutes a room temperature of 20 degrees C when the temperature outside is between -30 degrees C and +35 degrees C.

8.7.9 Ventilation:

A ventilation system must be installed in the ambulance compartment. It should not be located in the last metre of the compartment, nor on the roof but rather in an area that does not hinder the patient or the attendant. When the vehicle is stopped, the ventilation system must change the air in the ambulance compartment every 4 minutes. A switch on the ambulance compartment console controls this fan. When closed, the ambulance compartment must be airtight and watertight.

* Differential circuit breaker: Circuit breaker with protection against ground leaks.

8.8 Vehicle and Ambulance Compartment Exterior

8.8.1 Paint Color:

The basic paint color of the entire ambulance vehicle is to be white.

8.9 Ambulance Compartment Markings

8.9.1 All exterior marking on the ambulance vehicle must be reflective self-adhesive coatings.

8.9.2 "Ambulance Designation":

The word AMBULANCE must appear by means of a coating in "Helvetica" style letters of a reflective "primary blue" color.

The word AMBULANCE must be applied in the following locations: one on each side of the ambulance compartment, one at the rear and one inverted at the front.

The inscriptions on the sides and rear of the ambulance compartment must measure 1320 mm in length by 180 mm in height while the inscription at the front must measure 1320 mm in length by 130 mm in height.

8.9.3 Ambulance Striping:

All ambulance vehicles must have a uniform band of color in reflective self adhesive sheeting. Scotchlite series 580-14 orange is suggested.

8.9.4 Company Name:

A maximum surface area of 1,000 cm^2 is allocated on each side of the ambulance compartment for the company name.

8.9.5 Uniformity:

It is imperative that all ambulance vehicles have a uniform appearance so as to be easily recognized by members of the public.

8.9.6 Vehicle Identification Number:

A vehicle I.D. number assigned by the Health Services and Insurance Commission shall be displayed on every ambulance vehicle. The number shall be in characters 5 cm high, reflective sheeting on each side and rear of the vehicle.

9. PREPARATION FOR DELIVERY

9.1 Inspection:

The manufacturer or his representative must allow the assembler or the purchaser to inspect the vehicle in his garage prior to delivery or, when indicated on the purchase documents, in the garage of the purchaser or assembler, in order to verify that the vehicle meets all the requirements described herein and on the order form.

9.2 Road Test:

Each vehicle can be subject to a road test to check mechanical efficiency (see section 6.2.1) and the functioning of the electrical system when in service. These tests should be carried out according to different road alignment conditions and take into account the type and quality of the road surface. How well a concerted vehicle holds the road must be taken into consideration and no abnormal vibration must be accepted.

9.3 Documents to be given to the Purchaser:

For Final acceptance of the vehicle upon delivery, the documents below are required:

a) The manufacturer or his representative must provide:

- a detailed assembly line sheet or a delivery slip describing the equipment supplied by the manufacturer;
- a detailed list of the equipment installed by the dealer;
- an instructions booklet on the operation and maintenance of each vehicle;
- a duly completed and signed inspection certificate stating that the vehicle was inspected before delivery.

b) The assembler must provide:

- a list of the accessories installed;
- an instructions booklet in the language requested by the purchaser on the operation and maintenance of these accessories;

- an installation plan;

- a schematic diagram of all the ambulance's electrical circuits.

c) The manufacturer or his representative as well as the assembler must provide:

- the specific warranties for the vehicle, accessories and fittings covering at least 1 year from the official delivery date.

d) In compliance with the CMVSS standard, Transport Canada must issue:

- the national security mark.

:ATIONS

BAR LIGHT	LOCATION A	FRONT SIDE FLASHERS	LOCATION E
SIDE LOADING LIGHTS	LOCATION B	FRONT GRILLE FLASHERS	LOCATION F
REAR LOADING LIGHT	LOCATION C	REAR AMBER FLASHER	LOCATION H
REAR FLASHERS	LOCATION D		

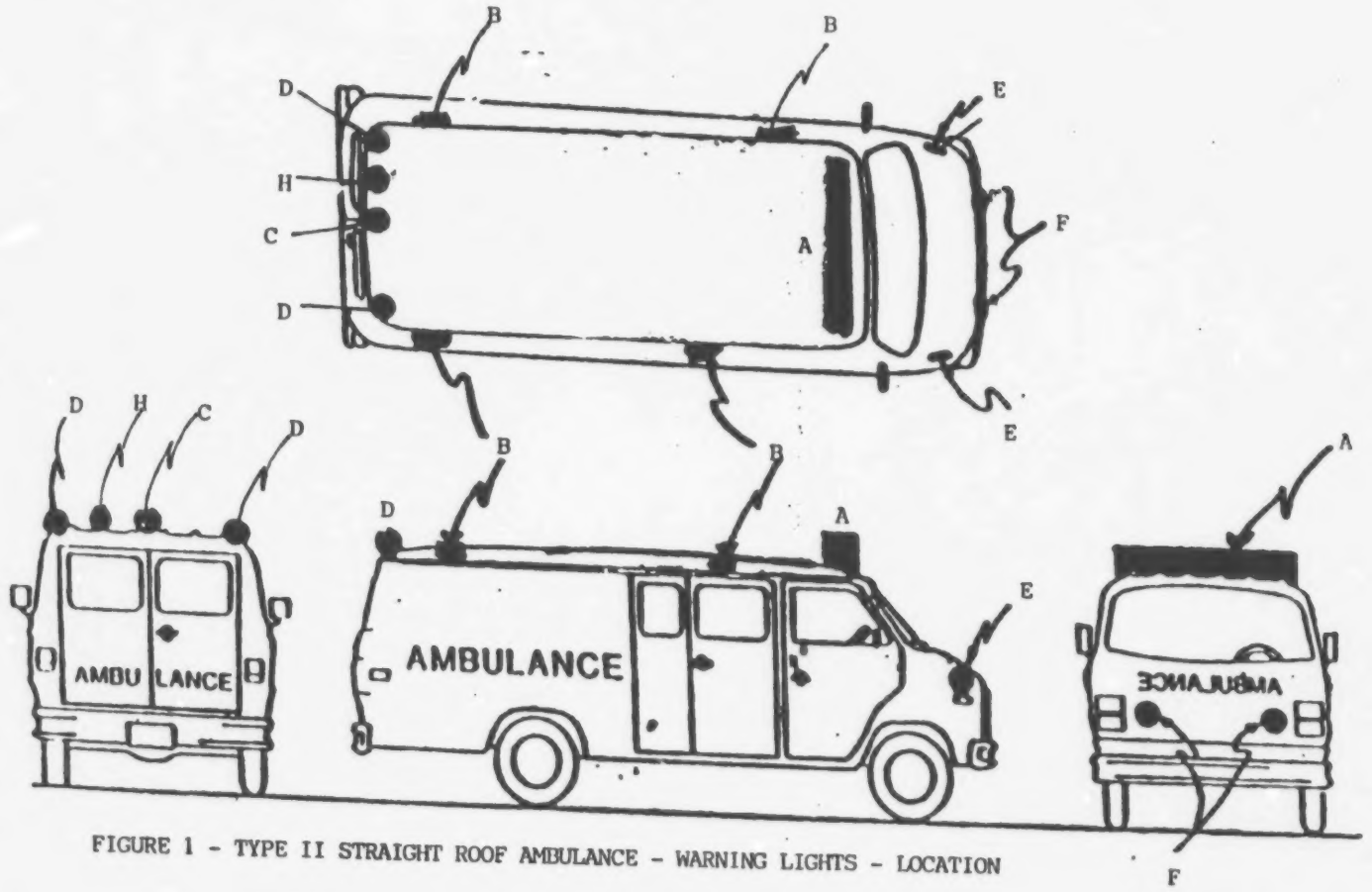


FIGURE 1 - TYPE II STRAIGHT ROOF AMBULANCE - WARNING LIGHTS - LOCATION

CATIONS

BAR LIGHT	LOCATION A	FRONT SIDE FLASHERS	LOCATION E
SIDE LOADING LIGHTS	LOCATION B	FRONT GRILLE FLASHERS	LOCATION F
REAR LOADING LIGHTS	LOCATION C	SIDE ROOF FLASHERS	LOCATION G
REAR FLASHERS	LOCATION D	REAR AMBER FLASHER	LOCATION H

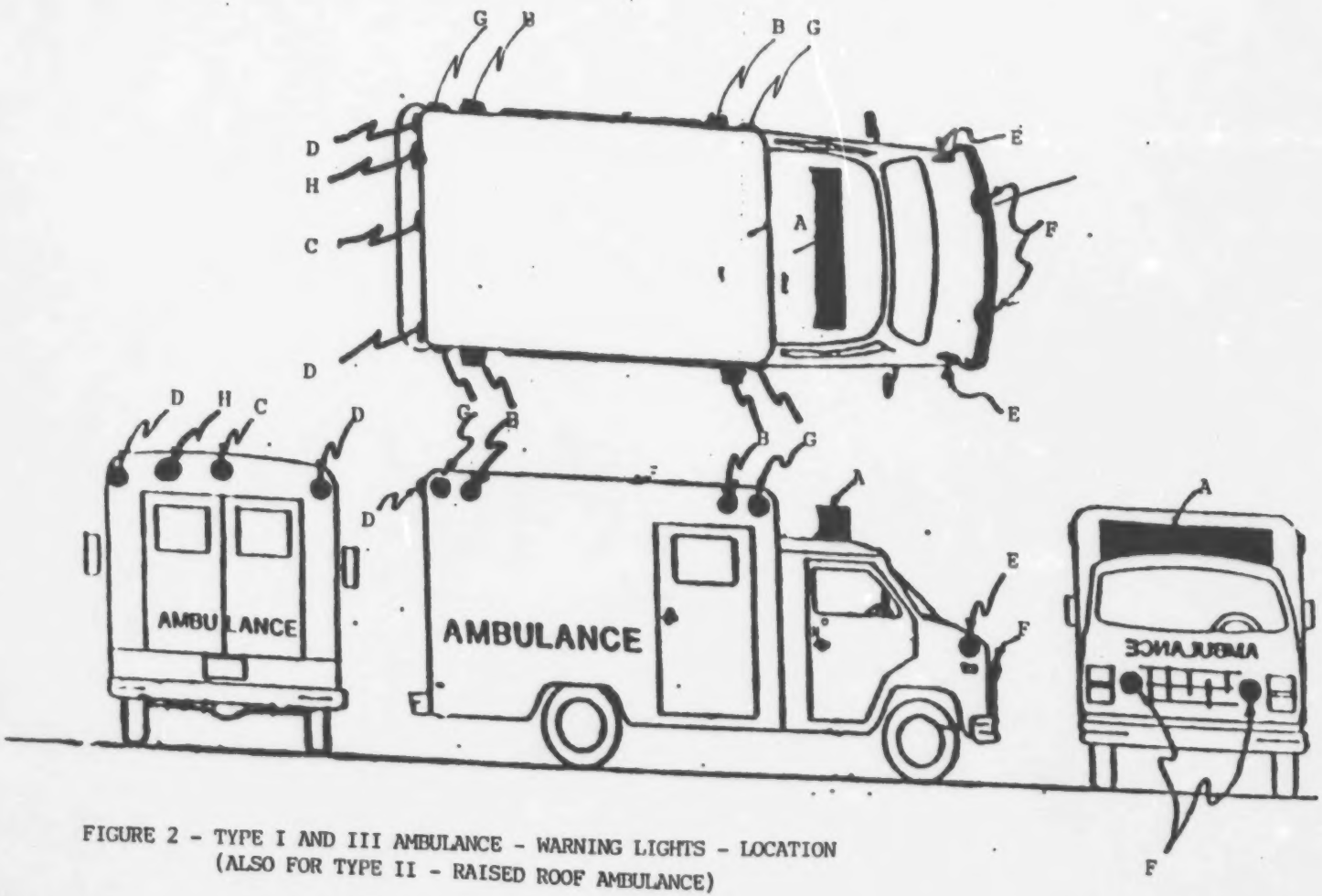


FIGURE 2 - TYPE I AND III AMBULANCE - WARNING LIGHTS - LOCATION
(ALSO FOR TYPE II - RAISED ROOF AMBULANCE)

.MARY (RESPONSE) MODE - ALTERNATING LOCATIONS 1 , 2, BAR LIGHT ON
SECONDARY (STATIONARY) MODE - ALTERNATING LOCATIONS 3 AND 4, BAR LIGHT OFF

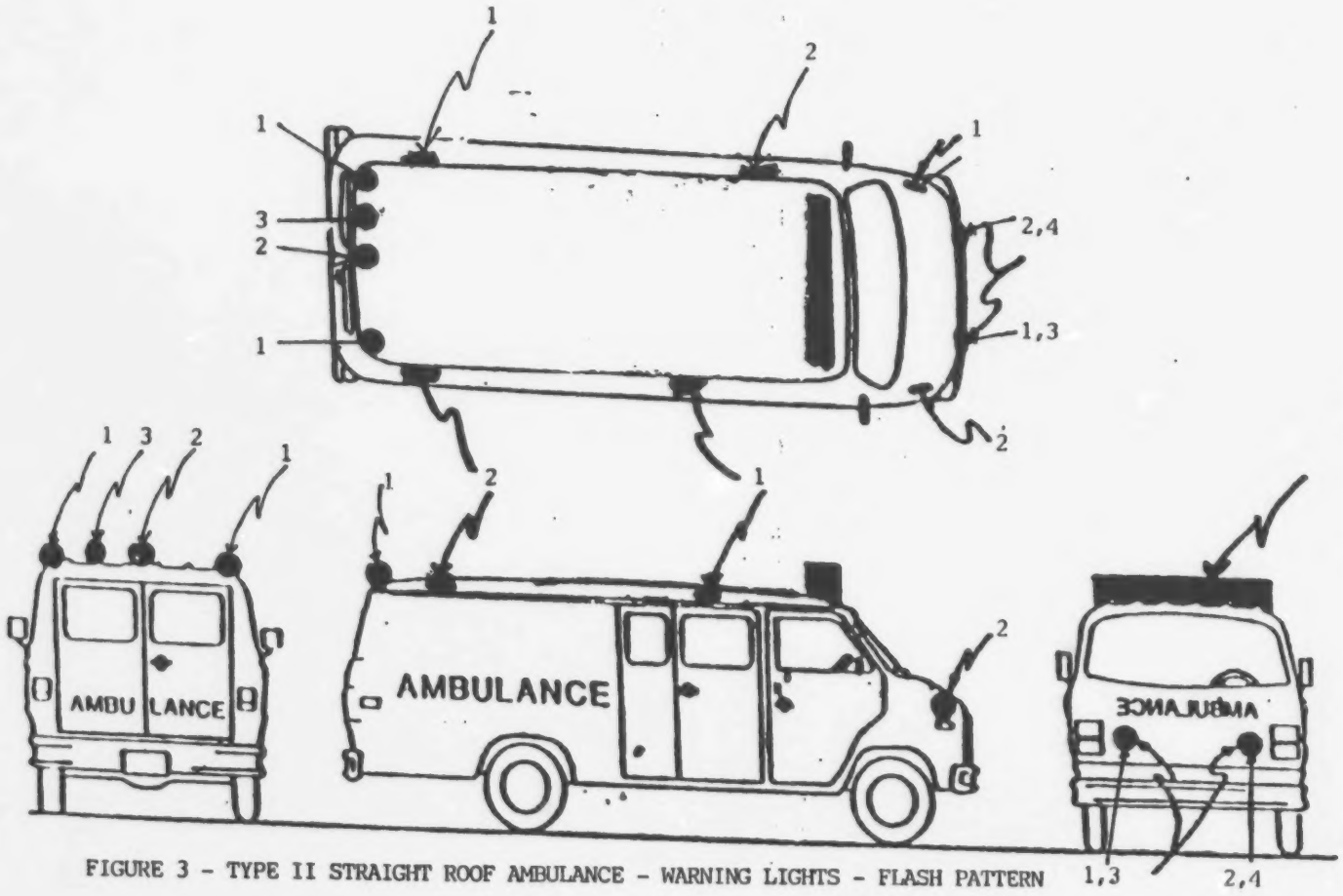


FIGURE 3 - TYPE II STRAIGHT ROOF AMBULANCE - WARNING LIGHTS - FLASH PATTERN

MARY (RESPONSE) MODE - ALTERNATING LOCATIONS 1 . 2, BAR LIGHT ON

SECONDARY (STATIONARY MODE - ALTERNATING LOCATIONS 3 AND 4

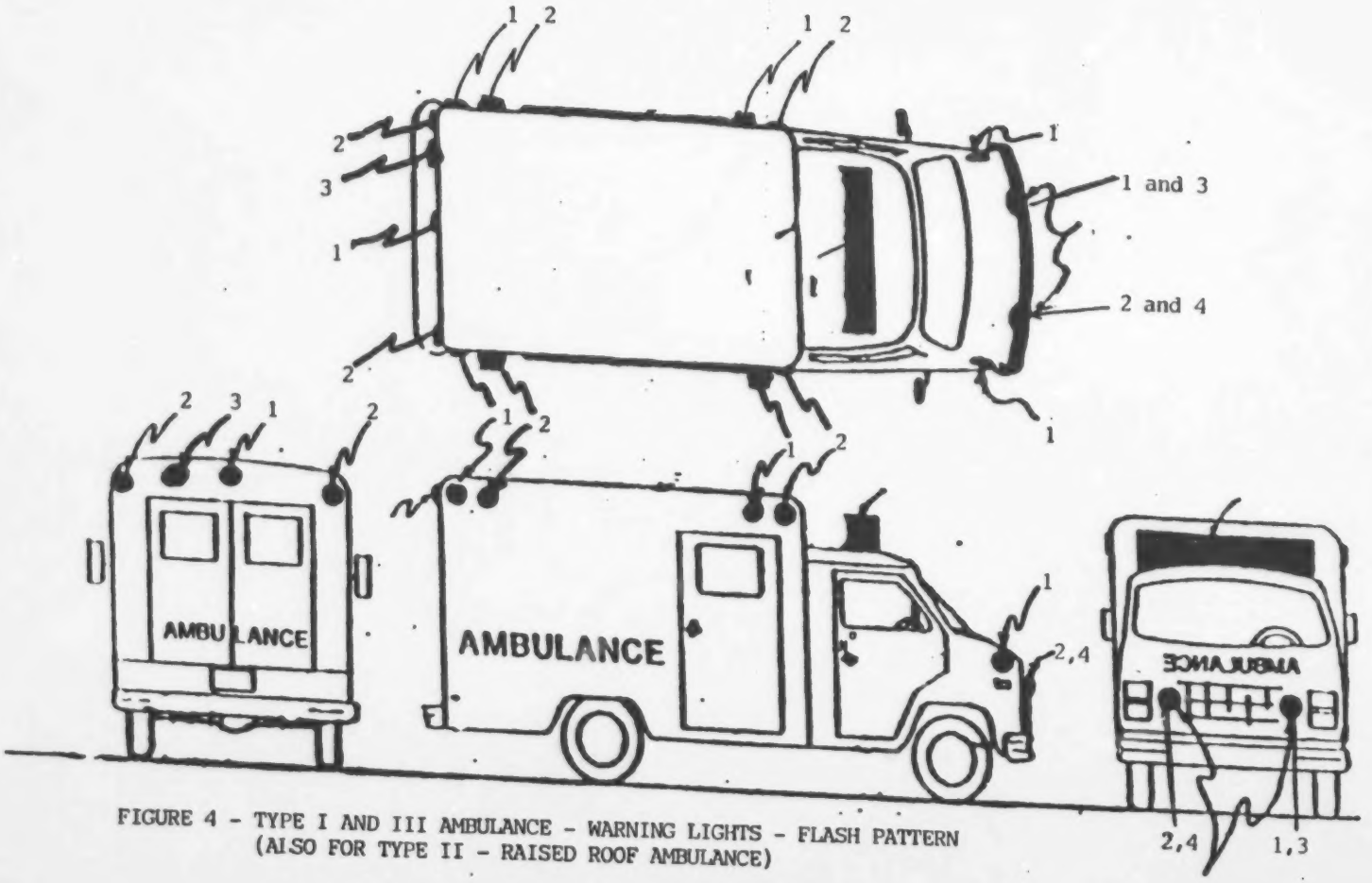
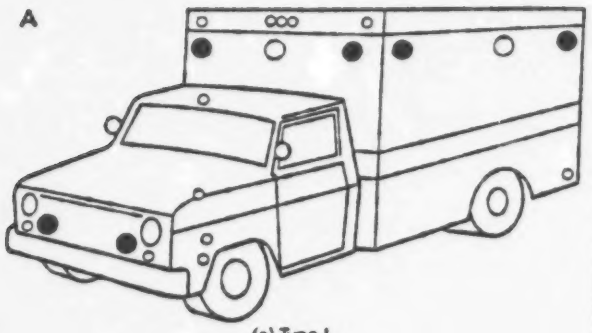


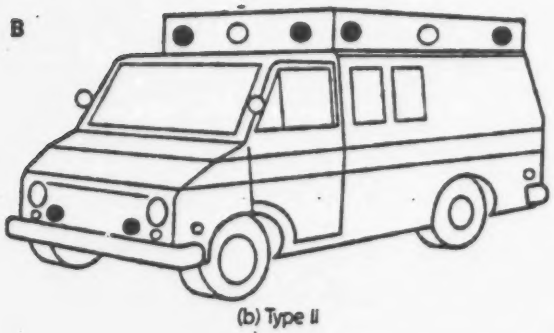
FIGURE 4 - TYPE I AND III AMBULANCE - WARNING LIGHTS - FLASH PATTERN
(ALSO FOR TYPE II - RAISED ROOF AMBULANCE)

A



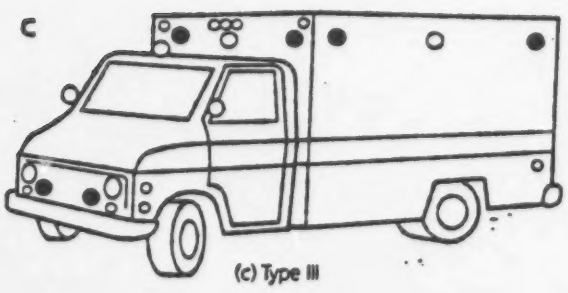
(a) Type I

B



(b) Type II

C



(c) Type III